LC4.31E

AB

Supplement to manual LC4.31E AA 3122 785 16210

Service
Service
Service

Service Manual

Contents **Page**

Published by WS 0662 TV Service Printed in the Netherlands Subject to modification EN 3122 785 16220

PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

Notes:

- Only information that is related to the IBO Zapper module is published in this manual. For the other information, see the relevant chassis manual (order code on front page).
- Some models in this chassis range have a different mechanical construction. The information given here is therefore model specific.
- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Specifications are indicative (subject to change).

1.1 Technical Specifications

1.1.1 Vision

Display type	: LCD, IPS
Screen size	:
- 26PF5521D/10/12	: 26” (66 cm), 16:9
- 32PF5521D/10/12	: 32” (82 cm), 16:9
- 37PF5521D/10	: 37” (94 cm), 16:9
- 26PF7521D/10	: 26” (66 cm), 16:9
- 32PF7521D/10	: 32” (82 cm), 16:9
- 37PF7521D/10	: 37” (94 cm), 16:9
- 42PF7421D/10	: 42” (107 cm), 16:9
Resolution (HxV pixels)	: 1366 x 768
Contrast ratio	:
- 26PF5521D/10/12	: 600:1
- 32PF5521D/10/12	: 800:1
- 37PF5521D/10	: 800:1
- 26PF7521D/10	: 600:1
- 32PF7521D/10	: 800:1
- 37PF7521D/10	: 800:1
- 42PF7421D/10	: 550:1
Light output (cd/m^2)	: 500
Response time (ms)	: 8
Viewing angle (HxV degrees)	:
- 26PF5521D/10/12	: 178x178
- 32PF5521D/10/12	: 178x178
- 37PF5521D/10	: 176x176
- 26PF7521D/10	: 178x178
- 32PF7521D/10	: 178x178
- 37PF7521D/10	: 176x176
- 42PF7421D/10	: 176x176
Tuning system	: PLL
TV Colour systems	: PAL B/G, D/K, I : SECAM B/G, D/K, L/L’
Video playback	: NTSC M/N 3.58, 4.43 : PAL B/G : SECAM L/L’
Supported computer formats	: VGA (640x480) : MAC (640x480) : SVGA (800x600) : XVGA (1024x768) : VGA (720x400)
Supported video formats	: 640x480p - 2fH : 720x576p - 2fH : 1280x720p - 3fH : 1920x1080i - 2fH
Presets/channels	: 100 presets
Tuner bands	: VHF : UHF : S-band : Hyper-band

1.1.2 Sound

Sound systems	: NICAM B/G, D/K, I, L : AV Stereo
Maximum power (W_{RMS})	:
- 26PF5521D/10/12	: 2 x 5
- 32PF5521D/10/12	: 2 x 15
- 37PF5521D/10	: 2 x 15
- 26PF7521D/10	: 2 x 5
- 32PF7521D/10	: 2 x 15
- 37PF7521D/10	: 2 x 15
- 42PF7421D/10	: 2 x 15

1.1.3 Miscellaneous

Power supply:	
Mains voltage (V_{AC})	:
- 26PF5521D/10/12	: 110 - 240
- 32PF5521D/10/12	: 110 - 240
- 37PF5521D/10	: 220 - 240
- 26PF7521D/10	: 110 - 240
- 32PF7521D/10	: 110 - 240
- 37PF7521D/10	: 220 - 240
- 42PF7421D/10	: 220 - 240
Mains frequency (Hz)	: 50 / 60
Ambient conditions:	
- Temperature range (°C)	: +5 to +40
- Maximum humidity	: 90% R.H.
Power consumption:	
Normal operation (W)	:
- 26PF5521D/10/12	: 100
- 32PF5521D/10/12	: 120
- 37PF5521D/10	: 180
- 26PF7521D/10	: 100
- 32PF7521D/10	: 120
- 37PF7521D/10	: 180
Stand-by (W)	:
- 26PF5521D/10/12	: < 1
- 32PF5521D/10/12	: < 1
- 37PF5521D/10	: < 2
- 26PF7521D/10	: < 1
- 32PF7521D/10	: < 1
- 37PF7521D/10	: < 2
- 42PF7421D/10	: < 2
Dimensions (WxHxD cm):	
- 26PF5521D/10/12	: 80.45 x 43.8 x 11.4
- 32PF5521D/10/12	: 92.4 x 50.7 x 11.9
- 37PF5521D/10	: 110.0 x 60.9 x 10.25
- 26PF7521D/10	: 69.75 x 49.48 x 9.97
- 32PF7521D/10	: 93.5 x 51.65 x 12.0

- 37PF7521D/10 : 111.4 x 61.8 x 10.3
- 42PF7421D/10 : 124.9 x 69.7 x 12.8

Weight (kg):
- 26PF5521D/10/12 : 13.3
- 32PF5521D/10/12 : 18.9
- 37PF5521D/10 : 25.1
- 26PF7521D/10 : 13.0
- 32PF7521D/10 : 19.2
- 37PF7521D/10 : 25.9
- 42PF7421D/10 : 32

1.2 Connection Overview

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Rear Connections

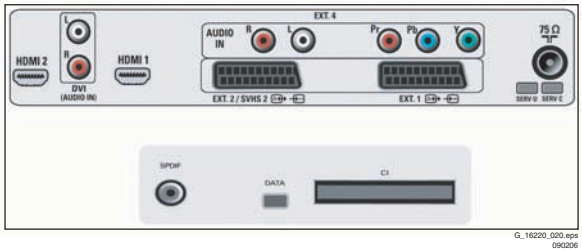


Figure 1-1 Rear I/O (26" and 32")

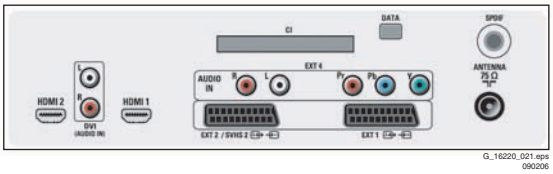


Figure 1-2 Rear I/O (37" and 42")

CI Common Interface: PCMCIA
68p - See diagram K7

S/PDIF Cinch: Out
Bk - Coaxial 0.2 - 0.6 V_{PP} / 75 ohm

Service connector (UART)
1 - UART_TX Transmit
2 - Ground Gnd
3 - UART_RX Receive

1.3 Chassis Overview

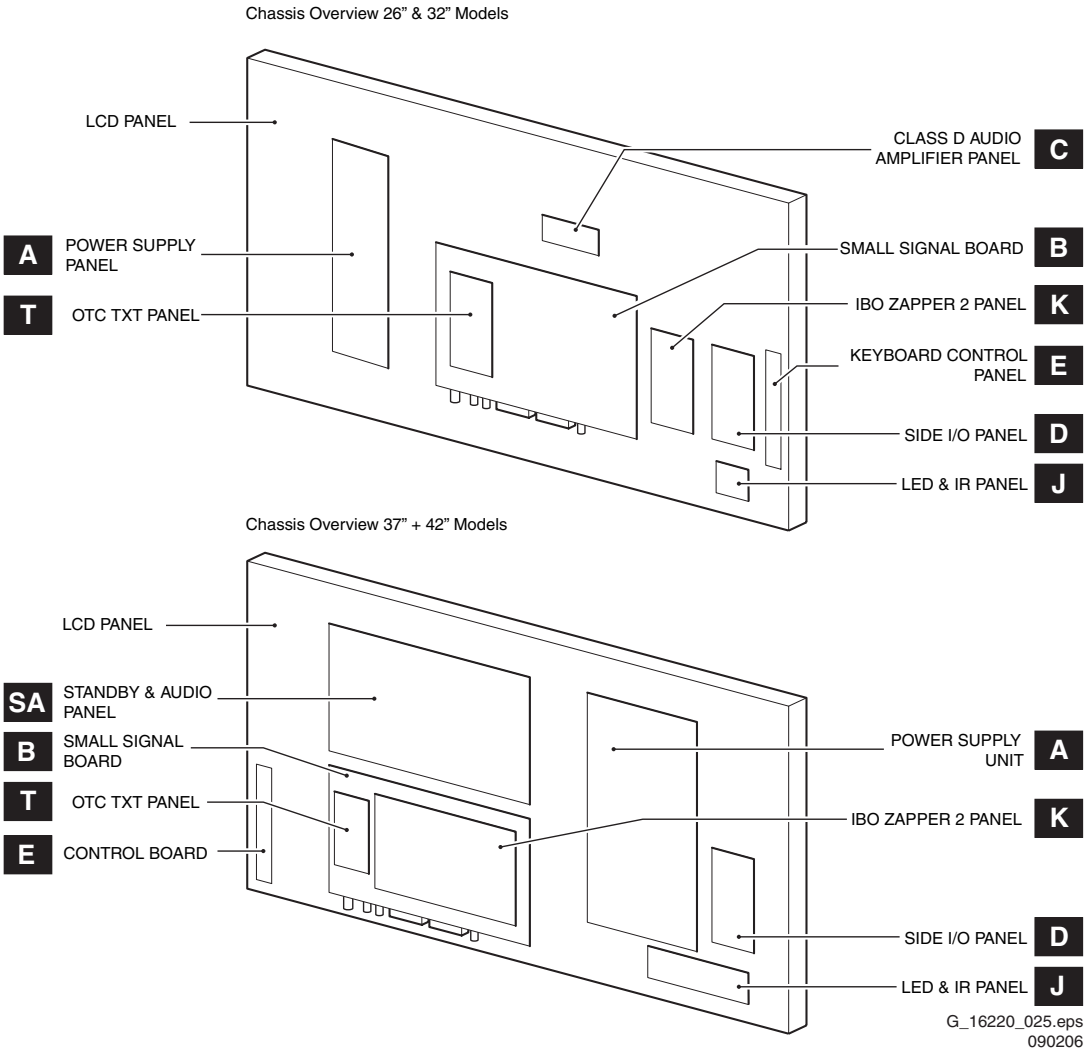


Figure 1-3 Chassis overview

2. Safety Instructions, Warnings, and Notes

See the relevant chassis manual (order code on front page).

3. Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

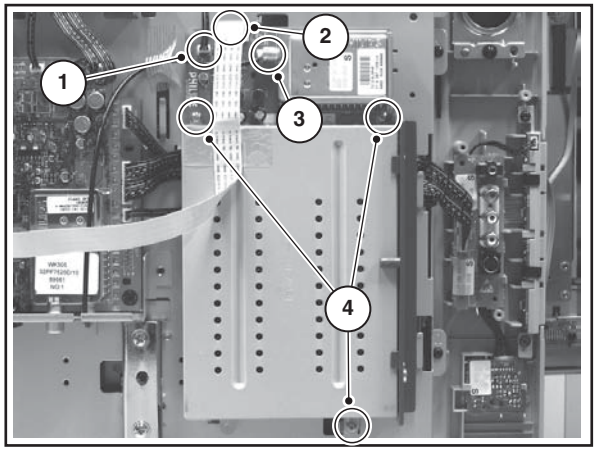
Index of this chapter:

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Follow the disassembling instructions in described order.
- Only information that is related to the IBO Zapper module is published in this manual. For the other information, see the relevant chassis manual (order code on front page).

4.1 Assy/Panel Removal

4.1.1 IBO Zapper Module (26" and 32")

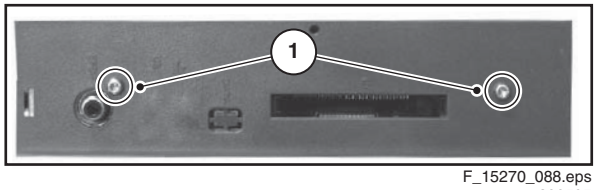


F_15270_087.eps
310505

Figure 4-1 IBO zapper module (26" and 32")

1. Disconnect the cable [1] from connector 1301 on the IBO zapper module.
2. Disconnect the flatcable [2] from connector 1500 on the IBO zapper module and remove the tape which secures it to the IBO zapper module.
3. Disconnect the antenna cable [3] from the tuner on the IBO zapper module.
4. Remove the torx screws [4] and remove the IBO zapper module from the TV set.

4.1.2 IBO Zapper Module Front Panel (26" and 32")

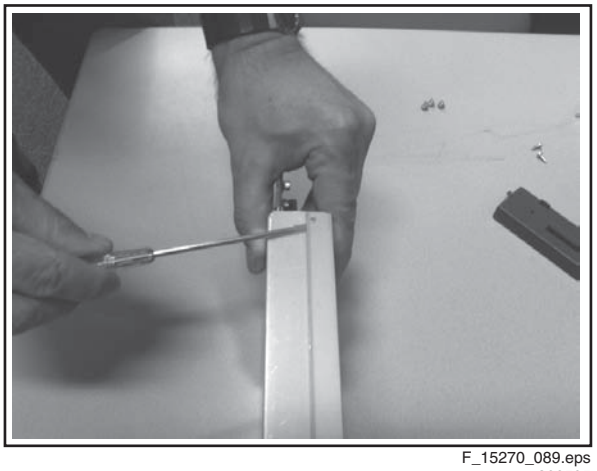


F_15270_088.eps
300505

Figure 4-2 IBO zapper module front panel

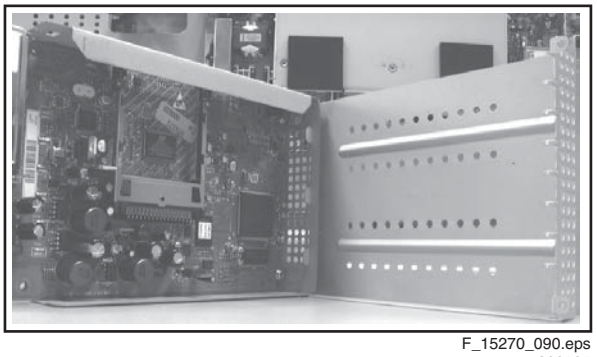
1. Remove the two screws [1].
2. Remove the front panel by shifting it sideways to unlock it.

4.1.3 Unlocking the metal cover of the IBO zapper module (26" and 32")



F_15270_089.eps
300505

Figure 4-3 Unlocking the metal cover of the IBO zapper module (26" and 32")

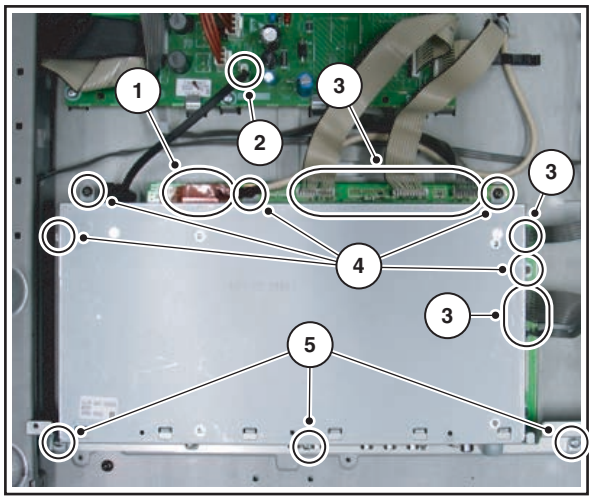


F_15270_090.eps
300505

Figure 4-4 Opening the IBO zapper module (26" and 32")

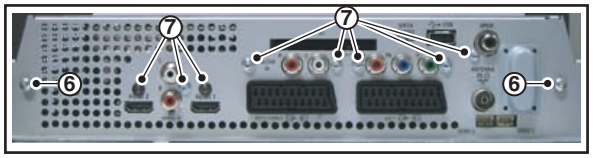
1. Unlock the metal cover with a screwdriver (see Figure "Unlocking the metal cover of the IBO zapper module (26" and 32")").
2. Unhook the metal cover from its hinges (see Figure "Opening the IBO zapper module (26" and 32")") and remove the cover (this is possible only if the front panel has been removed first).

4.1.4 Cover Shield for IBO-zapper & SSB (37" and 42")



G_16220_022.eps
090206

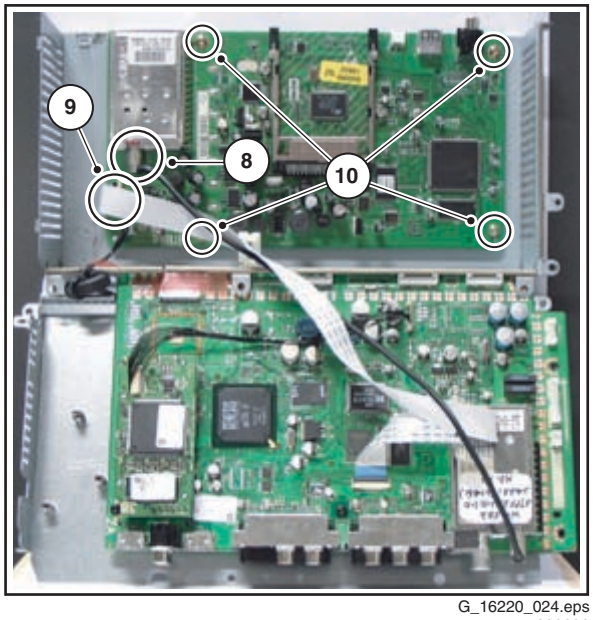
Figure 4-5 Cover shield (37" and 42")



G_16220_023.eps
090206

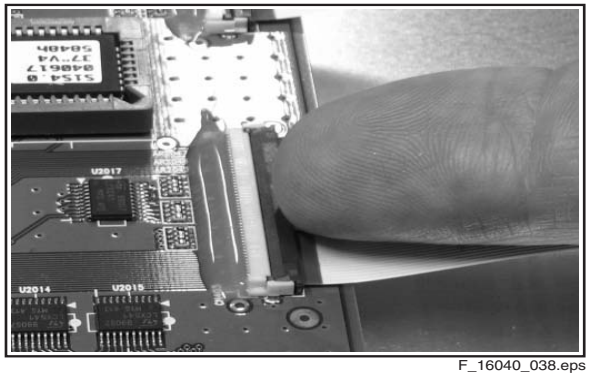
Figure 4-6 Connector screws (37" and 42")

1. Remove the rear cover from the set.
2. Very **cautiously** disconnect the LVDS cable [1] from the SSB panel (see Figure "Cover shield (37" and 42")"). Notice that this connector is very fragile.
3. Unplug the black cable [2] going from the IBO zapper/SSB to the Audio/STBY board.
4. Remove all other cables [3] from the IBO zapper/SSB.
5. Remove the fixation screws [4] that connect the top shielding with the bottom shielding.
6. Remove the fixation screws [5] that connect the connector plate to the frame.
7. Remove the fixation screws [6] that connect the shield to the rear connector plate, see Figure "Connector screws (37" and 42")".
8. Remove the fixation screws [7] from the connectors.
9. Remove the connector plate from the shielding.
10. Remove the upper part of the shield (with the IBO zapper attached to it) from the lower part of the shield (on which the SSB is located), by unhooking it from its brackets.
11. Disconnect the antenna connector [8] from the tuner, see Figure "IBO zapper & SSB (37" and 42")".
12. Carefully unlock the locking mechanism of the FFC connector [9] and remove the flatfoil cable (see Figure "How to unlock an FFC connector").
13. Finally, loosen four screws [10], and remove the IBO zapper from the top shielding.



G_16220_024.eps
090206

Figure 4-7 IBO-zapper & SSB (37" and 42")



F_16040_038.eps
021105

Figure 4-8 How to unlock an FFC connector

4.2 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original positions.
  Be careful with the fragile LVDS cable.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

Notes:

- Only information that is related to the IBO Zapper module is published in this manual. For the other information, see the relevant chassis manual (order code on front page).

5.1 Service Modes

5.1.1 Digital Customer Service Mode (DCSM)

Purpose

The Digital Customer Service Mode shows error codes and information on the IBO Zapper module operation settings. The call centre can instruct the customer to activate DCSM by telephone and read off the information displayed. This helps the call centre to diagnose problems and failures in the IBO Zapper module before making a service call.

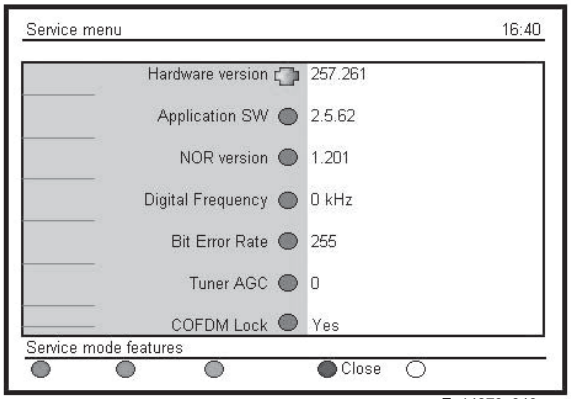
The DCSM is a read-only mode; therefore, modifications are not possible in this mode.

How to Activate

To activate the DCSM, put the television in its digital mode (via the A/D button on the remote control).

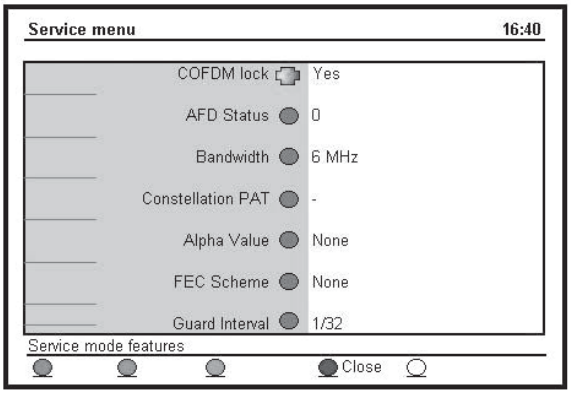
1. Press the “Digital” Menu button on the remote control to activate the digital user menu (“Setup”).
2. Activate the “Information” sub menu (via the “down” and “right” cursor buttons).
3. In the “Information” sub menu, press the following buttons on the remote control to activate the DCSM: “**GREEN RED YELLOW 9 7 5 9**”. Then, the “Service menu” will appear (see figures below).

Menu explanation



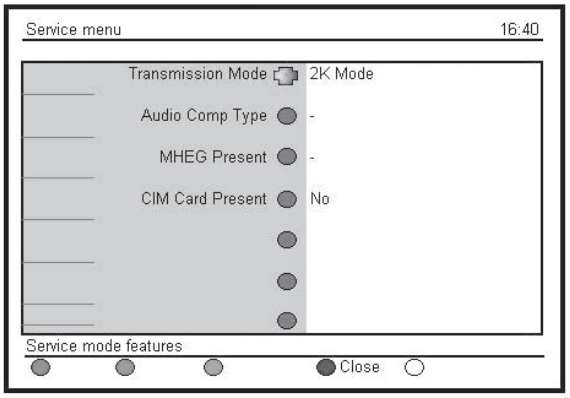
E_14970_040.eps
090904

Figure 5-1 DCSM menu - 1



E_14970_041.eps
100904

Figure 5-2 DCSM menu - 2



E_14970_042.eps
090904

Figure 5-3 DCSM menu - 3

1. **Hardware version:** This indicates the version of the IBO Zapper module hardware.
2. **Application SW:** The application software version.
3. **NOR Version:** The NOR Flash image software version
4. **Digital Frequency:** The digital frequency that the set is tuned to.
5. **Bit Error Rate:** The error rate measured before the error correction algorithm circuitry. (this value gives an impression of the received signal)
6. **Tuner AGC:** Tuner AGC value.
7. **COFDM Lock:** Indication if COFDM decoder is locked.
8. **AFD Status:** Status of the Active Picture Format Descriptor.
9. **Terrestrial Delivery System Parameters:**
   - **Bandwidth:** Bandwidth of the received signal.
   - **Constellation Pattern:** Displays the signal constellation.
   - **Alpha Value:** Displays the Alpha Value.
   - **FEC Scheme:** Displays the Forward Error Correcting Scheme
   - **Guard Interval:** Displays the value for the Guard Interval.
   - **Transmission Mode:** Displays the Transmission Mode.
10. **Audio Comp Type:** Type of detected audio stream.
11. **MHEG Present:** Indicates if MHEG is present or not.
12. **CIM Card Present:** Indicates if CIM card is present or not.

How to exit

Press the **BLUE** button on the Remote Control to exit DCSM.

5.2 Error Codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

5.2.1 How to Read the Error Buffer

You can read the error buffer in 3 ways:

- On screen via the SAM (if you have a picture).
  Examples:
  - ERROR: 0 0 0 0 0 : No errors detected
  - ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0 : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See “The Blinking LED Procedure”.
- Via ComPair.

5.2.2 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: “**062596**” directly followed by the OSD/i+ button (do not allow the display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is selected. Use the MENU UP/DOWN buttons, if necessary.
  - Press the MENU RIGHT button to clear the error buffer. The text on the right side of the “CLEAR” line will change from “CLEAR?” to “CLEARED”
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.2.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

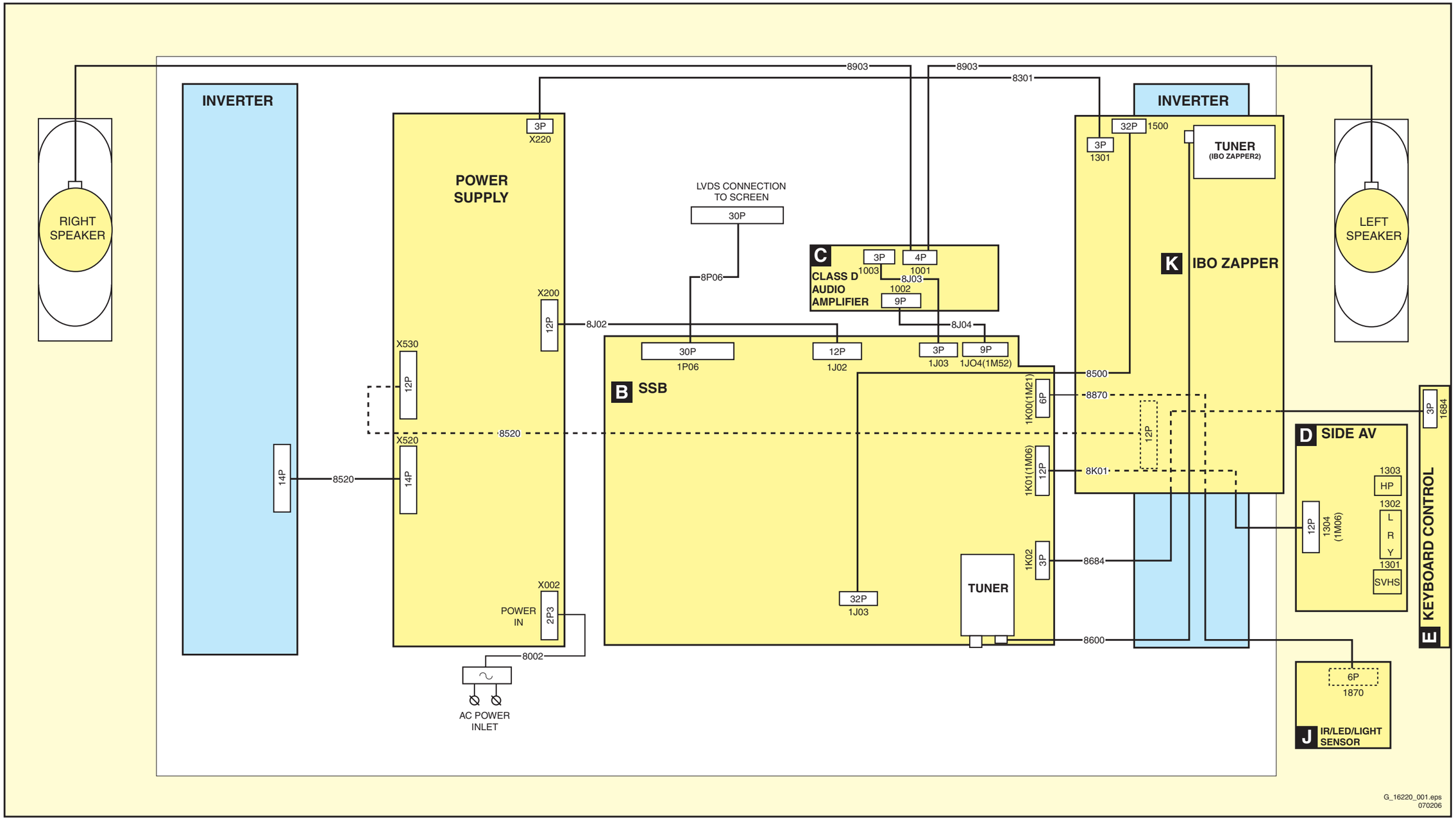
Table 5-1 Error code overview

Error	Error Description	Check Item	Diagram
0	No Error		
1	Mis-match of TV (Hercules) SW and Scaler SW	Software versions	N.A.
2	+12V from PSU error	PSU	A
3	Plasma I^2C error (only for plasma sets)	N.A.	N.A.
4	I^2C error while communicating with the Genesis Scaler	7801	B7 + B8
5	+5V protection	7752	B6
6	General I^2C error; communication between ADC, analogue tuner, and/or Columbus I^2C failed	1102, 7L01, 7M00	B1 + B18 + B19
7	I^2C error while communicating with ADC	7L01	B18
8	I^2C error while communicating with the Scaler EEPROM	7C01	B11
9	I^2C error while communicating with the Hercules EEPROM (NVM for TV). **Remark:** when the Hercules EEPROM is defective, the Hercules should operate with its default values.	7207	B2
10	I^2C error while communicating with the PLL tuner	1102	B1
11	I^2C error while communicating with the 3D combfilter IC-7M00 (Columbus)	7M00	B19
12	I^2C error while communicating with iBoard uP (only iTV sets)	N.A.	N.A.
13	I^2C error while communicating with the HDMI decoder IC-7D03 (only for NAFTA and AP)	N.A.	N.A.
14	Read-write error with the Scaler SDRAM	7B01	B10
15	I^2C error while communicating with the OTC	7001	T
16	I^2C error while communicating with EPLD or Pacific III	7N00	B20 + B21
17	I^2C error while communicating with the Digital Module (only for digital sets)	7100	K1

6. Block Diagrams, Test Point Overviews, and Waveforms

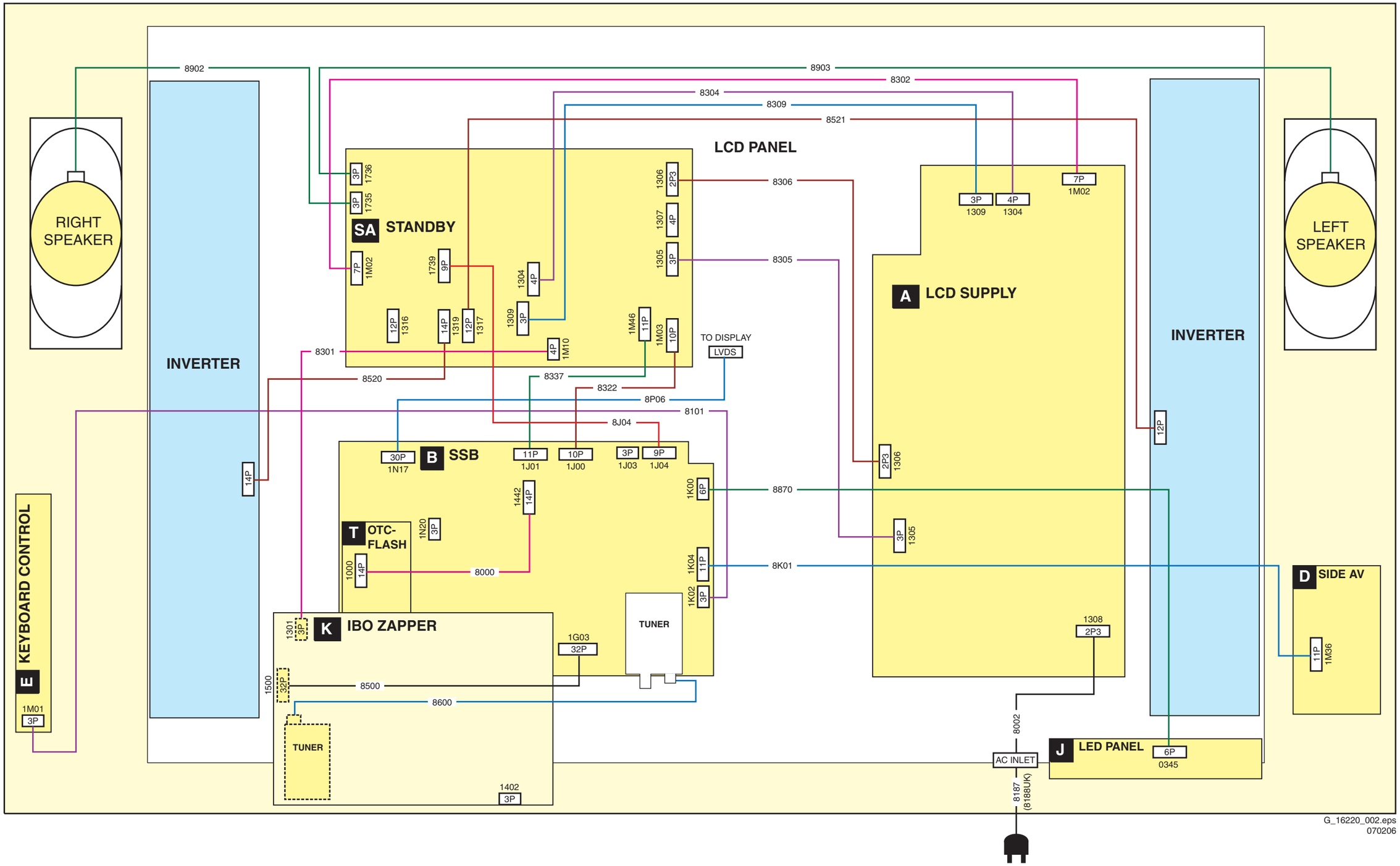
Wiring Diagram 26” & 32”

WIRING 26”- 32”



Wiring Diagram 37”

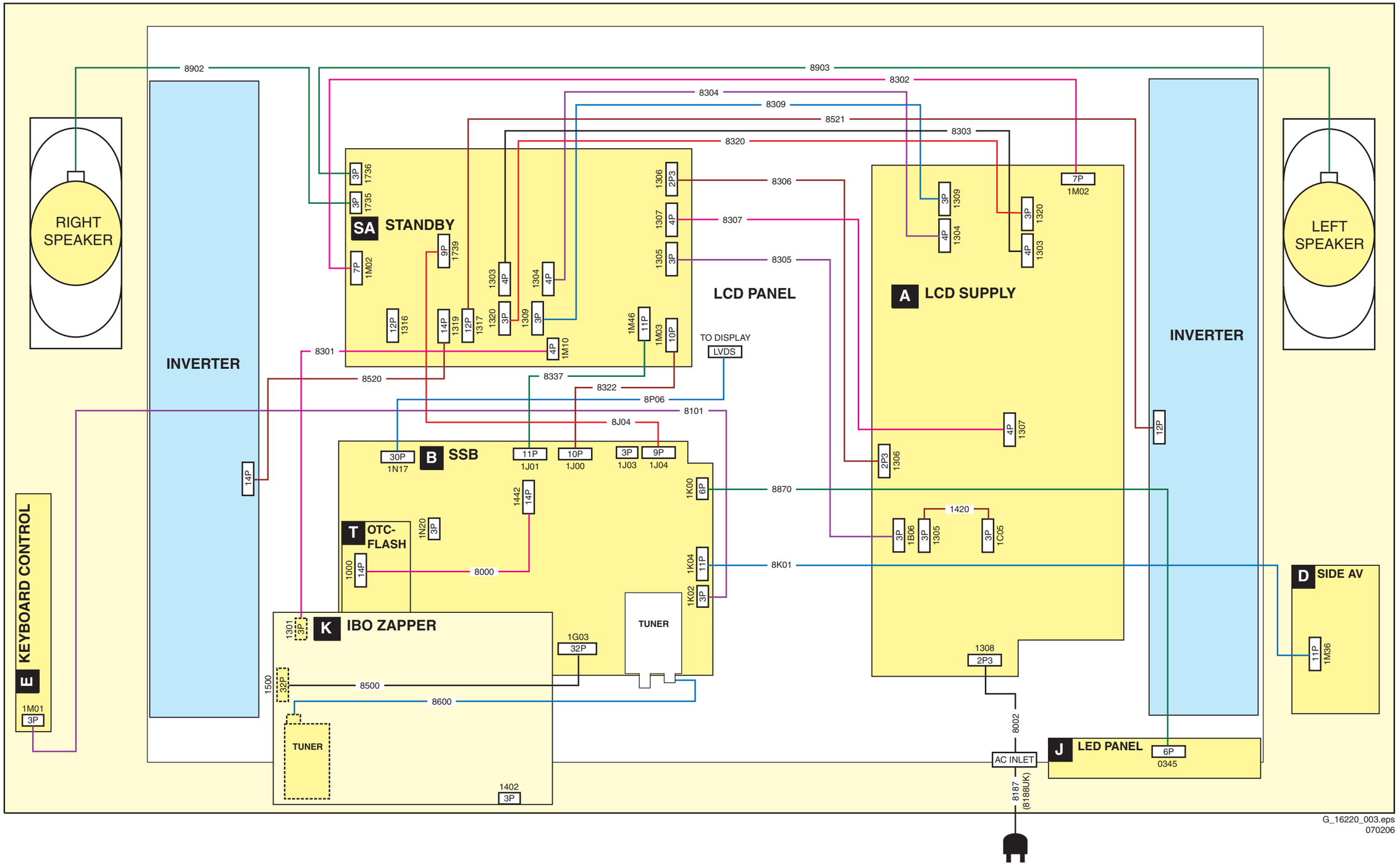
WIRING 37”



G_16220_002.eps
070206

Wiring Diagram 42”

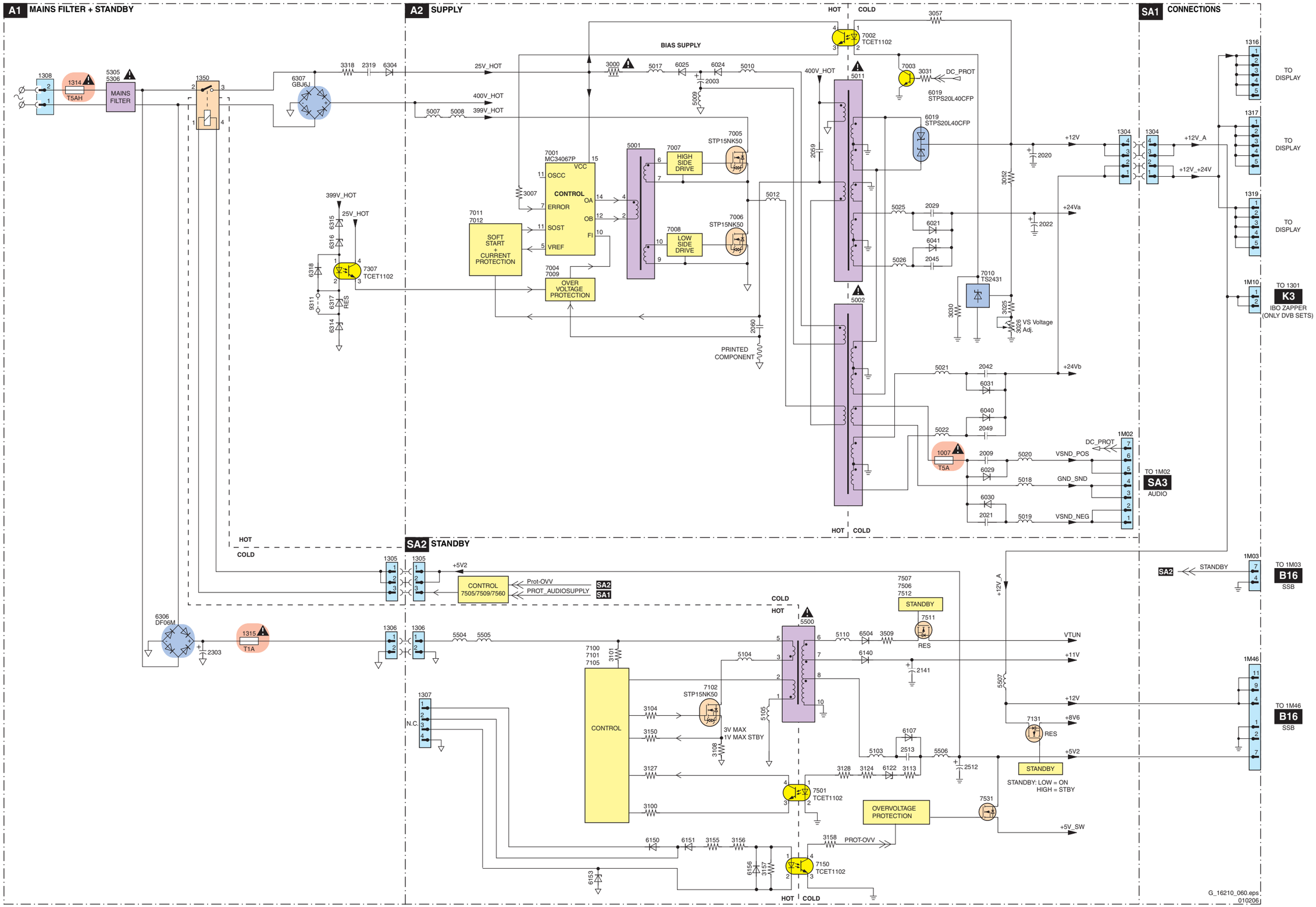
WIRING 42”



G_16220_003.eps
070206

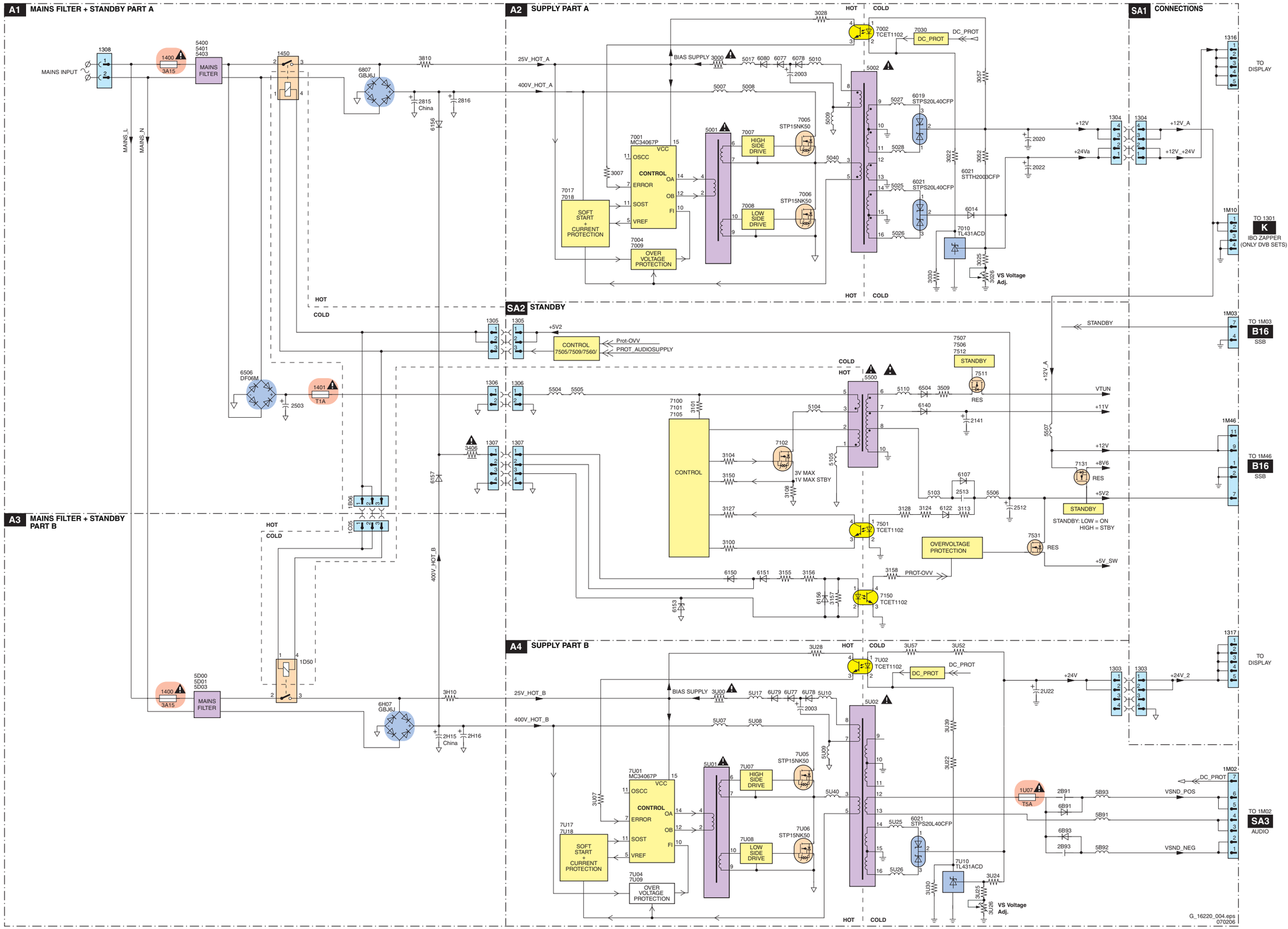
Block Diagram Supply 37”

SUPPLY 37"

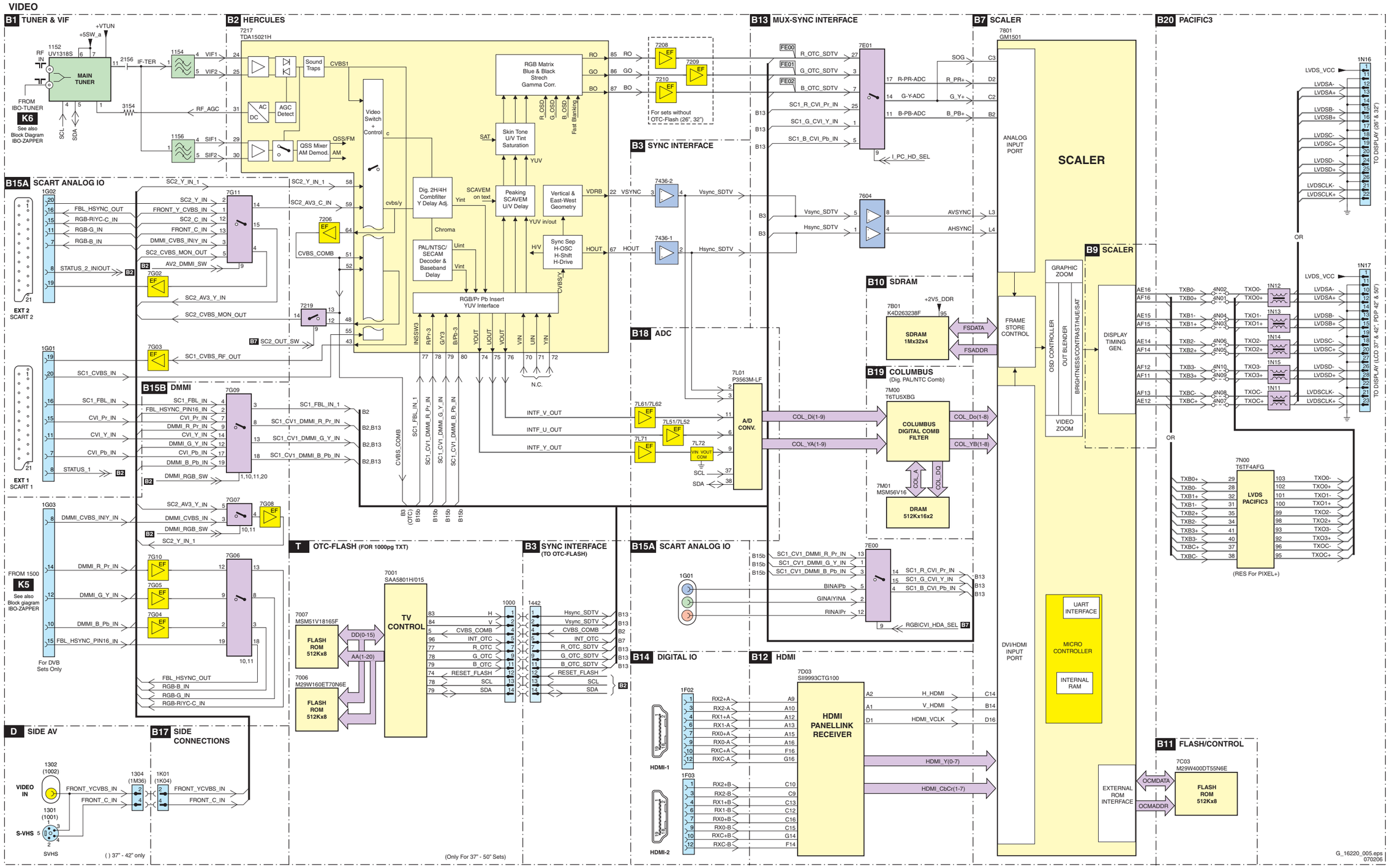


Block Diagram Supply 42”

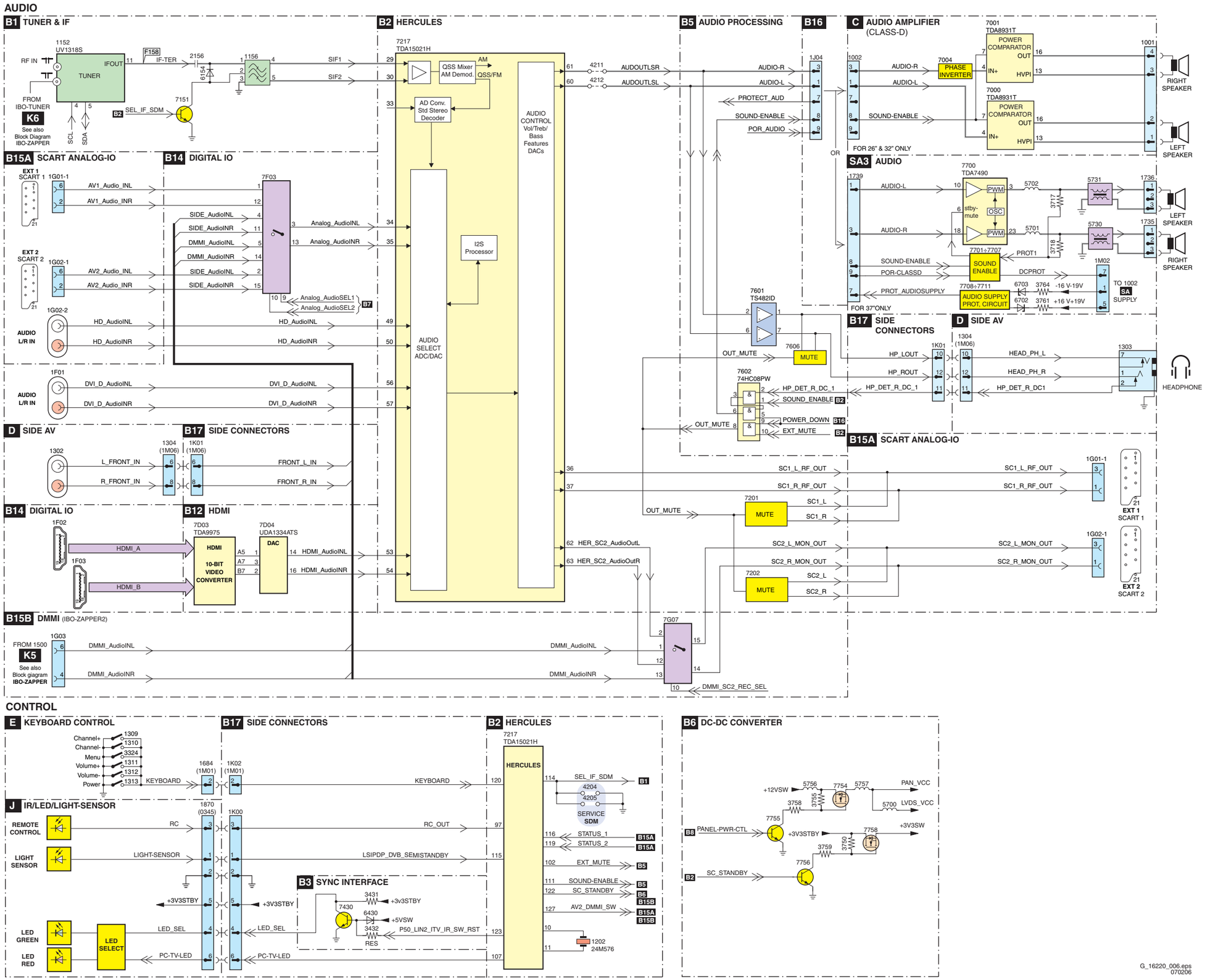
SUPPLY 42"



Block Diagram Video

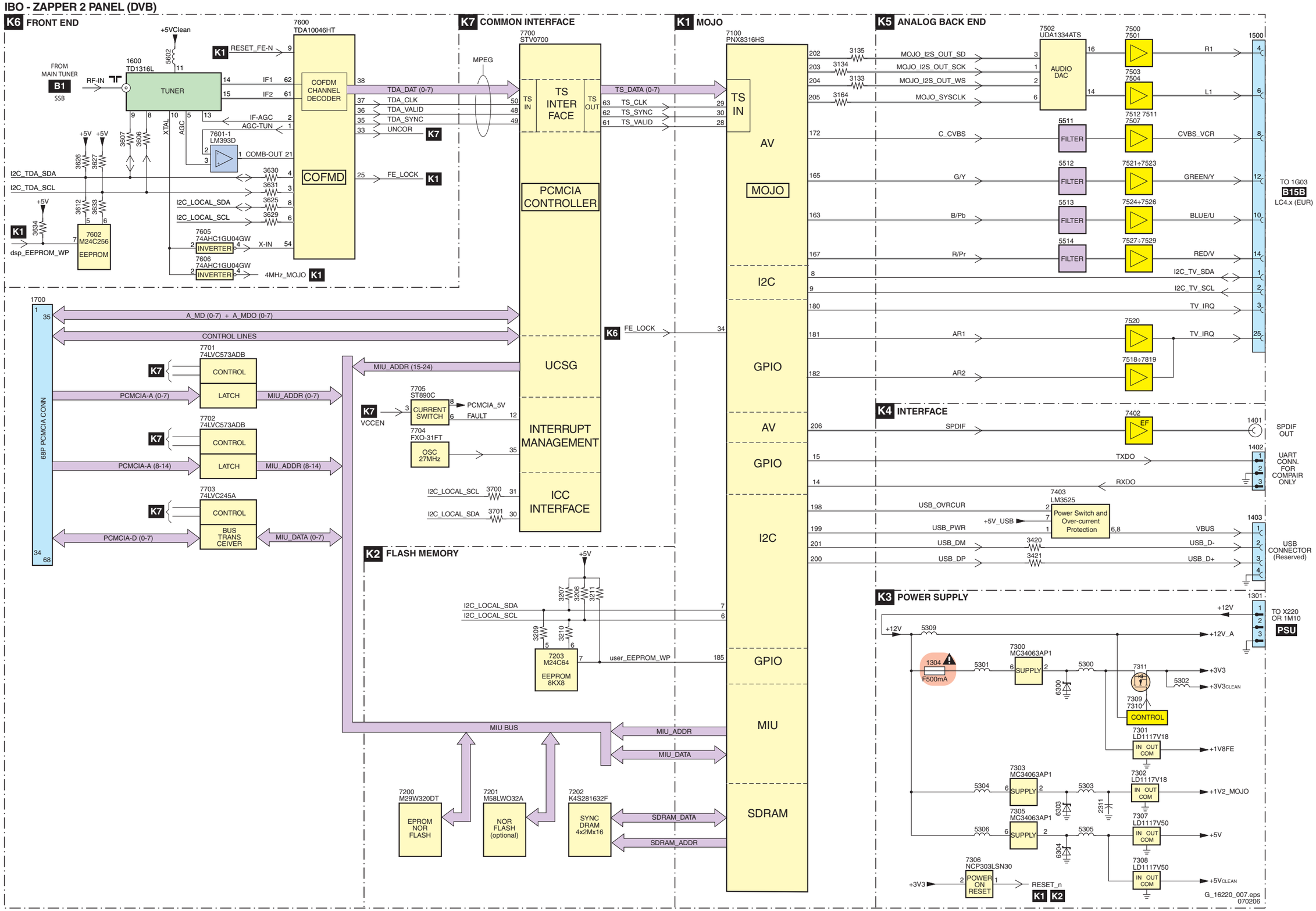


Block Diagram Audio & Control

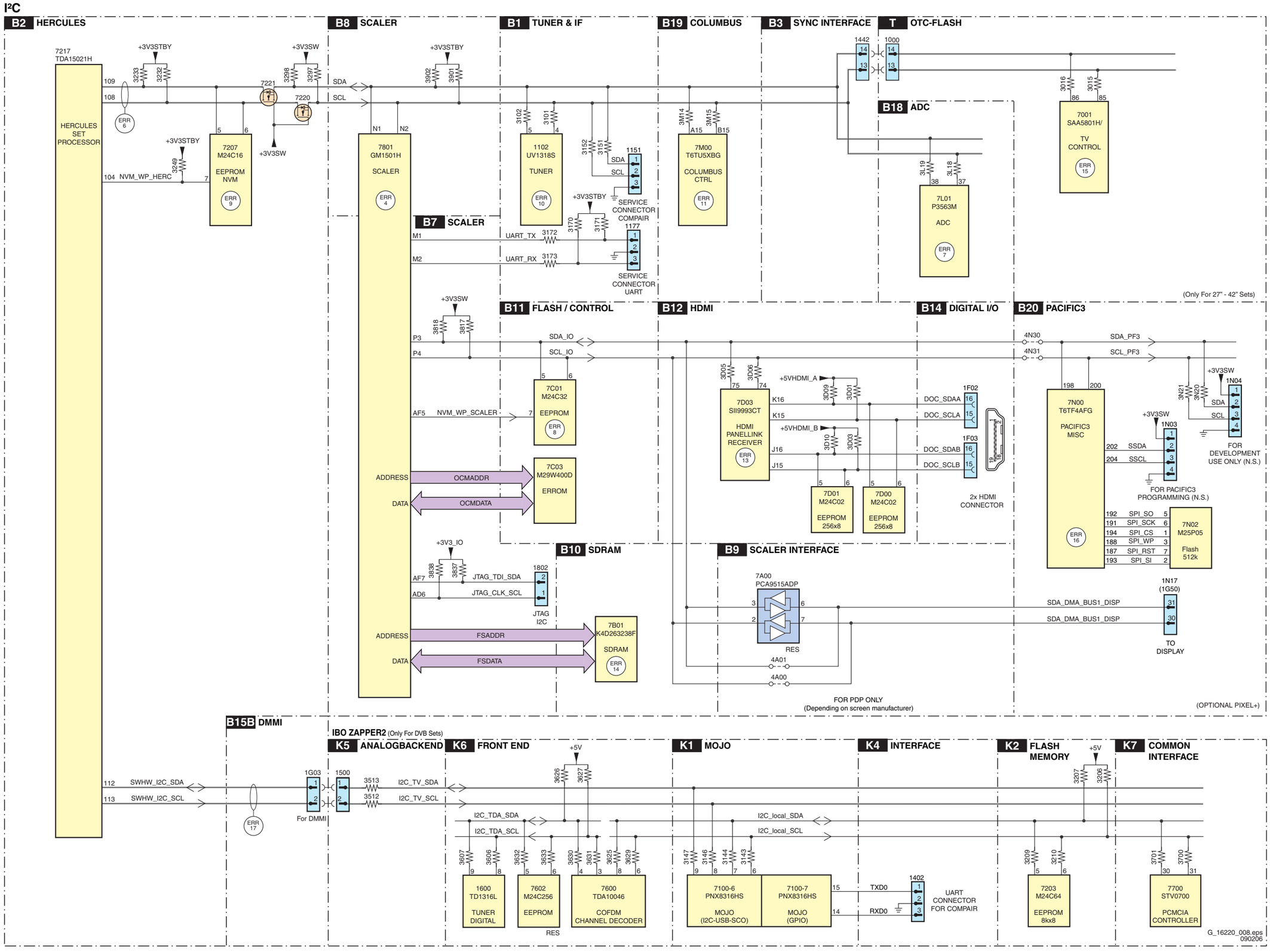


Block Diagram IBO Zapper

IBO - ZAPPER 2 PANEL (DVB)

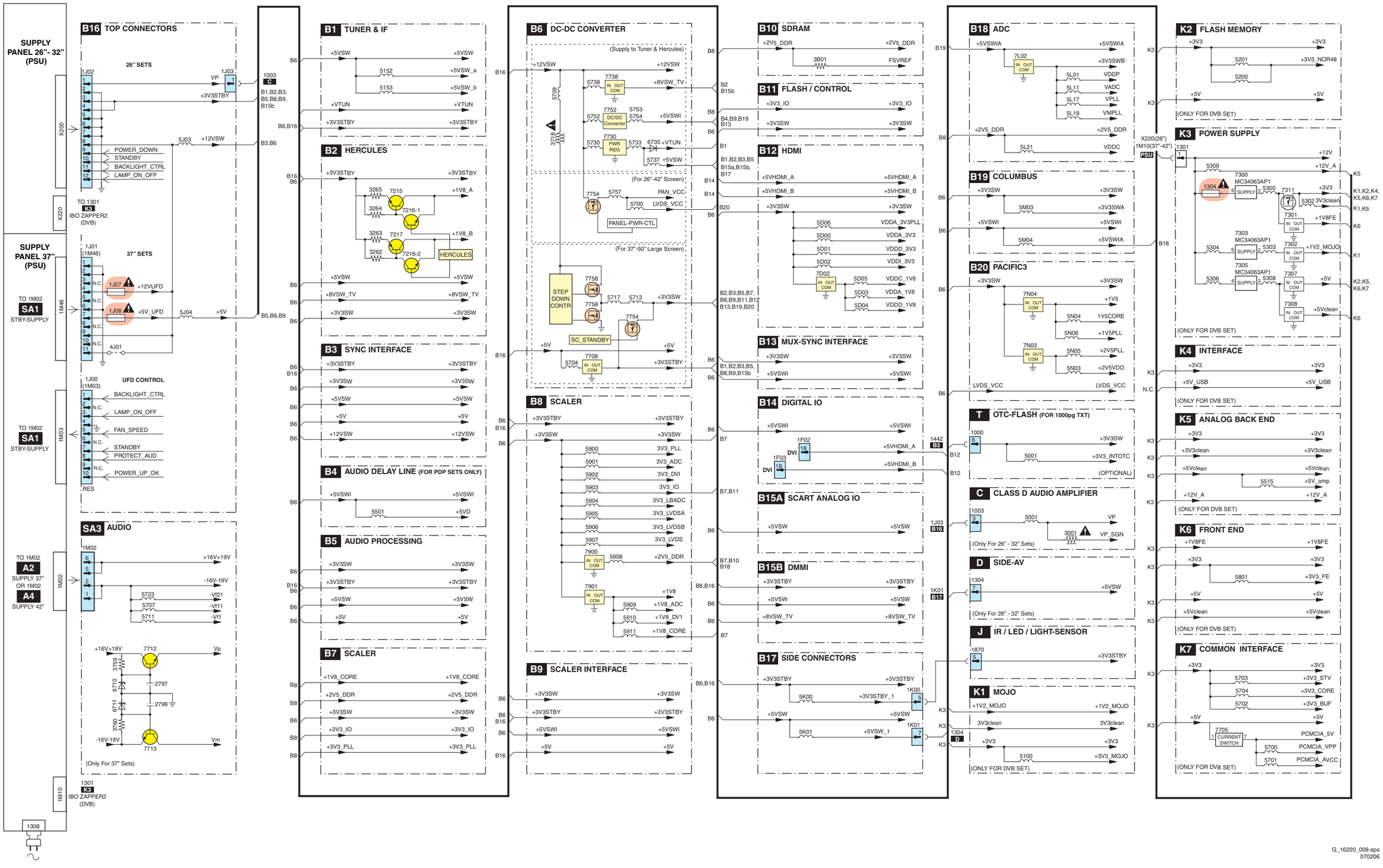


I²C Overview



Supply Voltage Overview

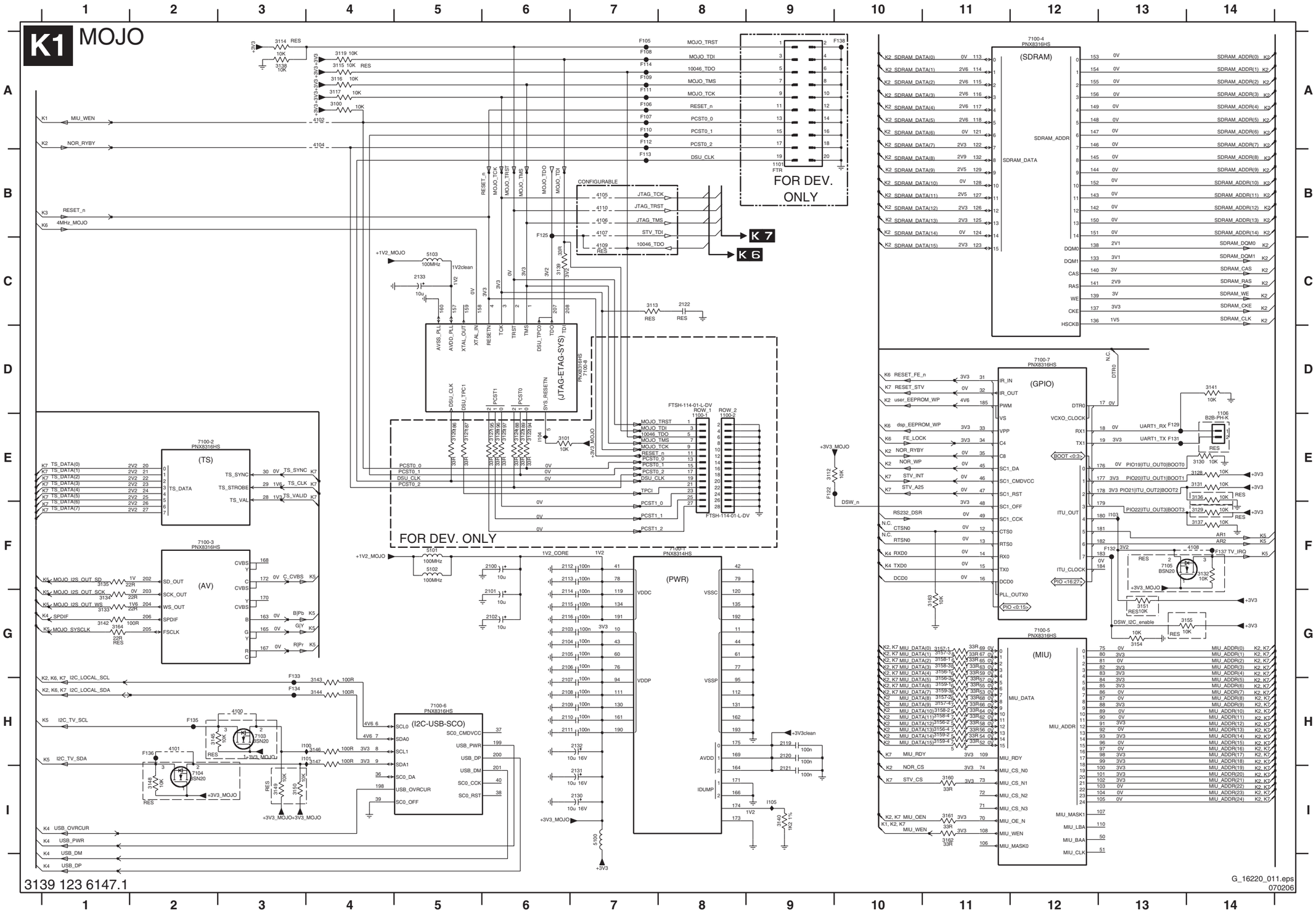
SUPPLY LINE OVERVIEW



G_16220_009.eps
070206

7. Circuit Diagrams and PWB Layouts

IBO Zapper Panel: MOJO



IBO Zapper Panel: Flash Memory

K2 FLASH MEMORY

K2

EPROM 4Mx8/2Mx16

2/4/8MB NOR FLASH

2/4/8MB NOR FLASH

Φ SYNC DRAM 4x2Mx16

Φ (8Kx8) EEPROM SYSTEM EEPROM

MECHANICAL 3.5MM HOLE

0001 TYPE
0002 TYPE
0003 TYPE
0004 TYPE

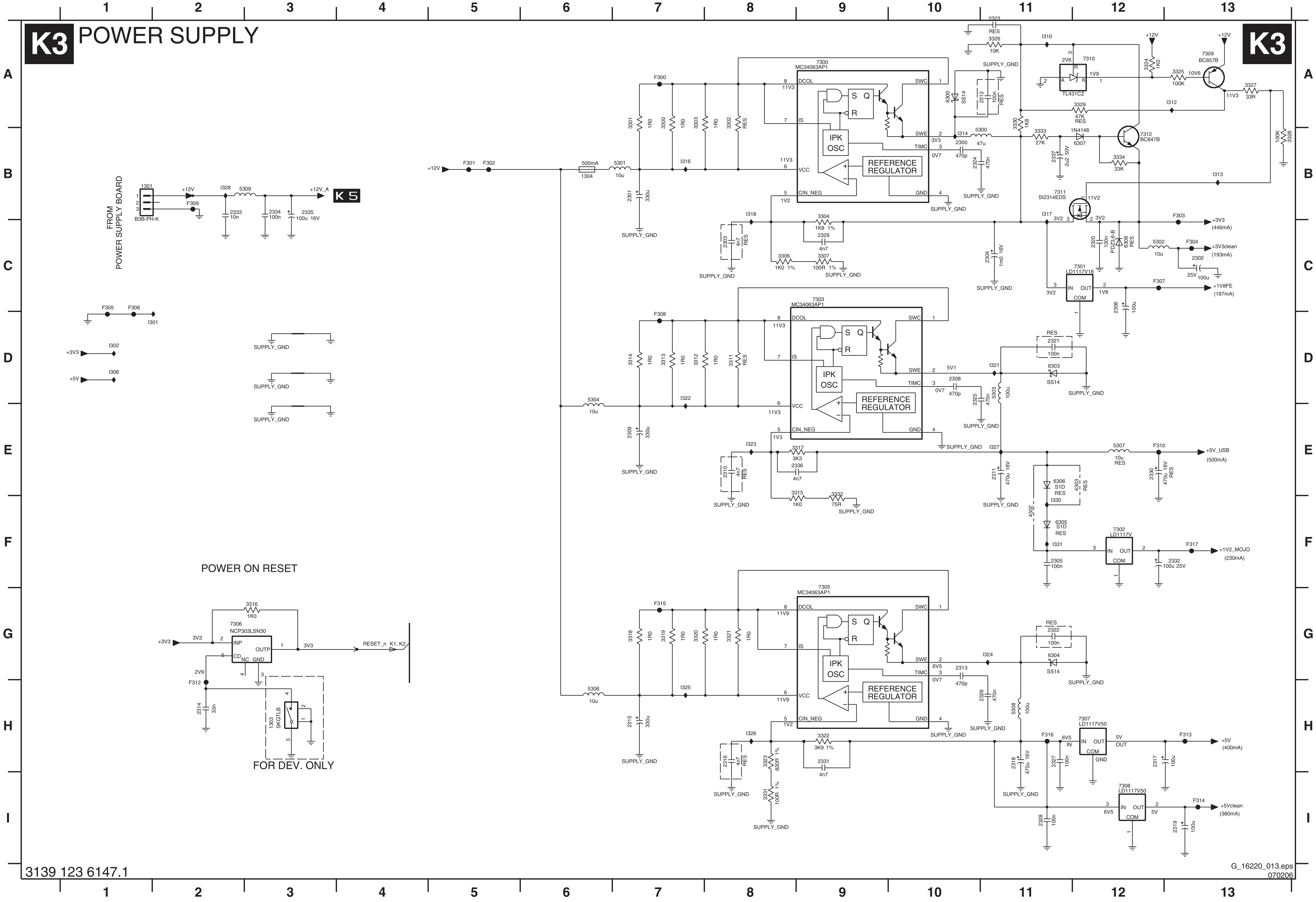
0005 HEATSINK
0006 HEATSINK
0007 HEATSINK
0008 HEATSINK
0009 HEATSINK
0010 HEATSINK
0011 HEATSINK
0012 HEATSINK
0013 HEATSINK
0014 HEATSINK
0015 HEATSINK
0016 HEATSINK
0017 HEATSINK
0018 HEATSINK

0001 H1
0002 H2
0003 H2
0004 H2
0005 H3
0006 H4
0007 H4
0008 H5
0009 H5
0010 H6
0011 H6
0012 H7
0013 H8
0014 H9
0015 H9
0016 H10
0017 H10
0018 H11
2200 B13
2201 B12
2202 B13
2203 B8
2204 B9
2205 B13
2206 E5
2207 E4
2208 E4
2209 E4
2210 E4
2211 E4
2212 E4
2213 E4
2214 F11
3200 D6
3201 D14
3202 E13
3203 E11
3204 E12
3205 D9
3206 F12
3207 F13
3209 G13
3210 G13
3211 F12
3212 D11
4200 D7
4201 D7
4202 D7
4203 D7
4204 D7
4205 D9
4212 F13
4213 E13
4214 D11
4215 D9
5200 B12
5201 B8
5202 D3
5203 F12
7200 B8
7201 B12
7202 E3
7203 G11
F200 F12
F201 E7
I200 B12
I201 B8
I202 D4
I203 D12
I204 D7
I205 E7
I206 D9
I207 F12
I208 G13
I209 E12
I210 E12
I211 E13

3139 123 6147.1

G_16220_012.eps
070206

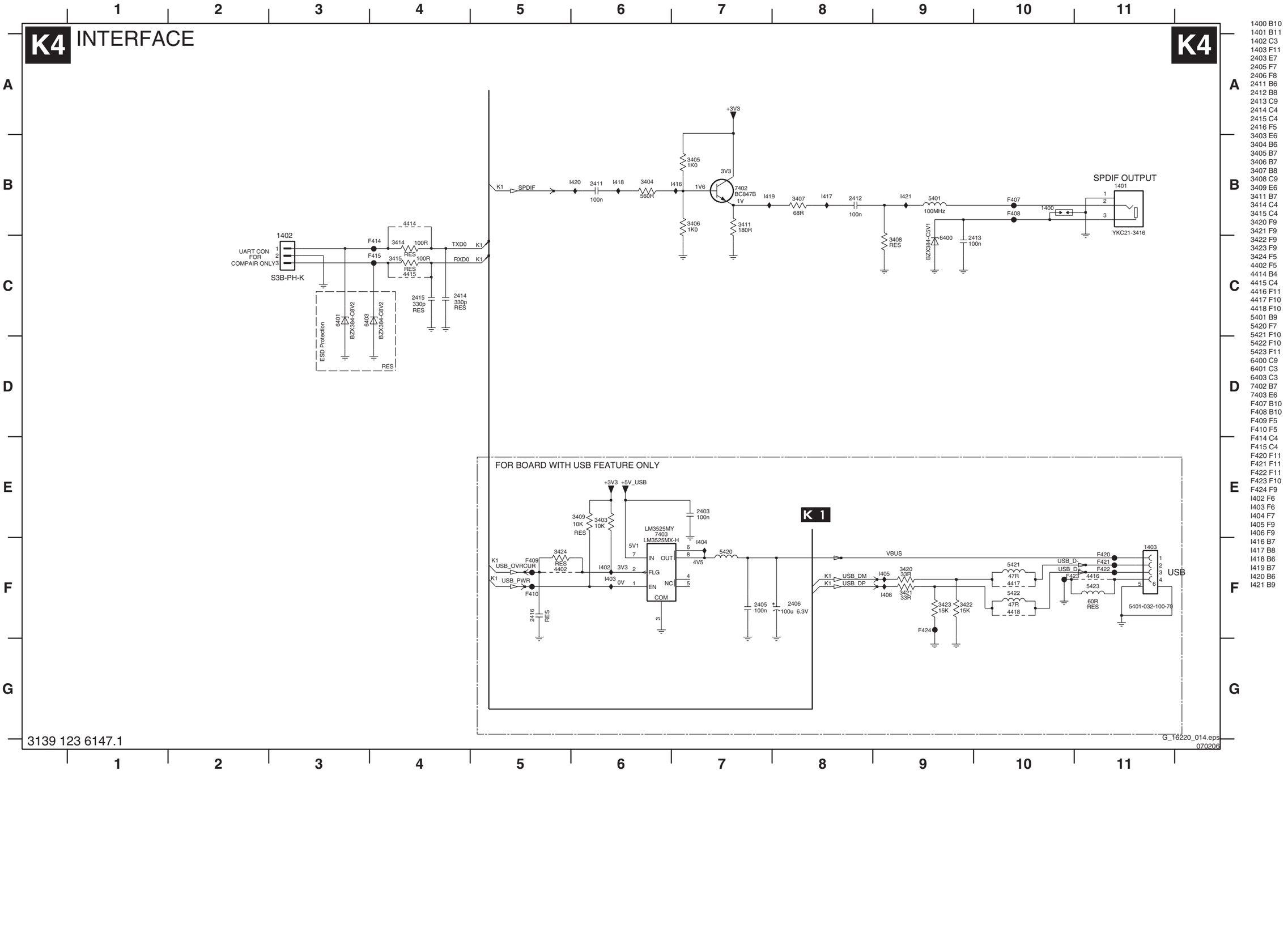
IBO Zapper Panel: Power Supply



1301 B1	F310 E12
1303 H3	F312 H2
1304 B6	F313 H13
2300 B10	F314 I13
2301 B7	F315 G7
2302 C13	F316 H11
2303 C8	F317 F13
2304 C11	I301 D2
2305 F11	I302 D1
2306 C12	I306 D1
2308 D10	I310 A11
2309 E7	I312 A13
2310 E8	I313 B13
2311 E11	I314 B10
2312 A11	I316 B7
2313 G10	I317 B11
2314 H2	I318 B8
2315 H7	I321 D11
2316 H8	I322 D7
2317 H12	I323 E8
2318 H11	I324 G11
2319 I13	I325 H7
2320 C12	I326 H8
2321 D11	I327 E11
2322 G11	I328 B2
2323 A11	I330 F11
2324 B10	I331 F11
2325 D10	
2326 H11	
2327 H11	
2328 I11	
2329 C9	
2330 E12	
2331 H9	
2332 F13	
2333 B2	
2334 B3	
2335 B3	
2336 E9	
2337 B11	
3300 A7	
3301 A7	
3302 A8	
3303 A7	
3304 B9	
3306 C8	
3307 C9	
3311 D8	
3312 D7	
3313 D7	
3314 D7	
3315 E9	
3316 G3	
3317 E9	
3318 G7	
3319 G7	
3320 G7	
3321 G8	
3322 H9	
3323 H8	
3324 A12	
3325 A13	
3326 A11	
3327 A13	
3328 B13	
3329 A12	
3330 A11	
3331 I8	
3332 F9	
3333 B11	
3334 B12	
4302 F11	
4303 E12	
5300 B11	
5301 B7	
5302 C12	
5303 D11	
5304 D6	
5306 H6	
5307 E12	
5308 H11	
5309 B3	
6300 A10	
6303 D11	
6304 G11	
6305 F11	
6306 E11	
6307 B12	
6308 C12	
7300 A9	
7301 C12	
7302 F12	
7303 C9	
7305 G9	
7306 G2	
7307 H12	
7308 I12	
7309 A13	
7310 A12	
7311 B11	
7312 B12	
F300 A7	
F301 B5	
F302 B5	
F303 B13	
F304 C13	
F305 C1	
F306 C1	
F307 C12	
F308 D7	
F309 B2	

IBO Zapper Panel: Interface

K4 INTERFACE



1400 B10
1401 B11
1402 C3
1403 F11
2403 E7
2405 F7
2406 F8
2411 B6
2412 B8
2413 C9
2414 C4
2415 C4
2416 F5
3403 E6
3404 B6
3405 B7
3406 B7
3407 B8
3408 C9
3409 E6
3411 B7
3414 C4
3415 C4
3420 F9
3421 F9
3422 F9
3423 F9
3424 F5
4402 F5
4414 B4
4415 C4
4416 F11
4417 F10
4418 F10
5401 B9
5420 F7
5421 F10
5422 F10
5423 F11
6400 C9
6401 C3
6403 C3
7402 B7
7403 E6
F407 B10
F408 B10
F409 F5
F410 F5
F414 C4
F415 C4
F420 F11
F421 F11
F422 F11
F423 F10
F424 F9
I402 F6
I403 F6
I404 F7
I405 F9
I406 F9
I416 B7
I417 B8
I418 B6
I419 B7
I420 B6
I421 B9

3139 123 6147.1

G_16220_014.eps
070206

IBO Zapper Panel: Analog Back End

K5 ANALOG BACK END

K5

TO SSB B15 B23

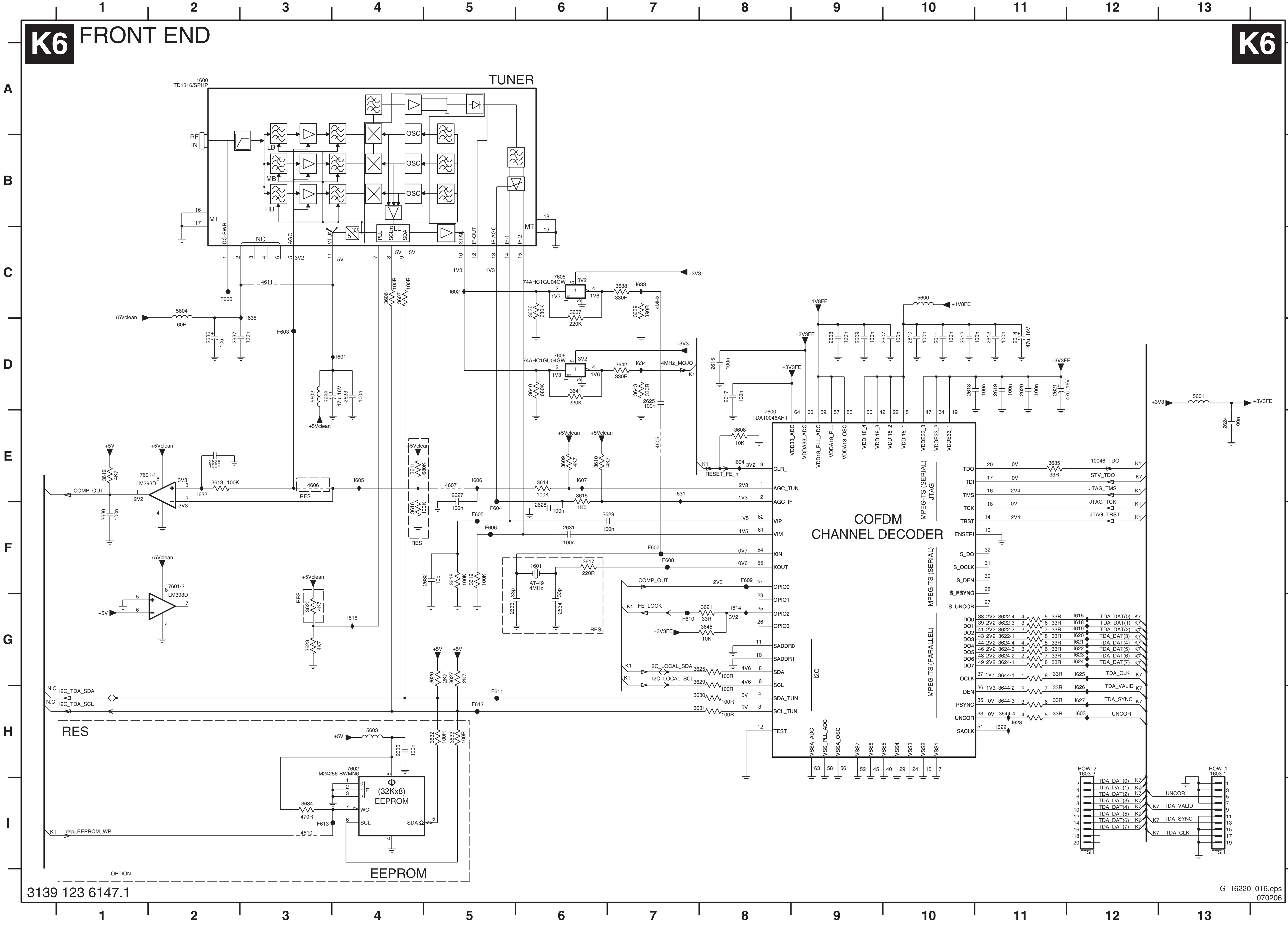
VOLTAGE MEASURED IN SDM MODE

3139 123 6147.1

G_16220_015.eps 070206

1500 C13	4506 D7	I560 G9
2500 A7	4507 B2	I561 H12
2501 A6	4508 H6	I562 D12
2502 A3	4509 I8	I563 D13
2503 C7	4510 I11	I564 D11
2504 A3	4511 E7	I565 E12
2505 B7	4512 E13	I566 E12
2506 B5	5502 A4	I567 E13
2507 C5	5504 E4	I568 E10
2508 C8	5505 G4	I569 E11
2509 A12	5507 H4	I570 E11
2510 A12	5508 I4	I571 F12
2511 D3	5511 E3	I572 F10
2512 D4	5512 G3	I573 F11
2513 D8	5513 H3	I574 F12
2514 D6	5514 I3	
2515 D6	5515 A8	
2516 A8	5528 A5	
2517 A9	6503 E5	
2520 E3	6507 D13	
2521 F4	6508 E13	
2522 F3	6509 G6	
2523 F3	6510 H8	
2524 G3	6511 I10	
2525 G3	6512 G6	
2526 G3	6513 H8	
2527 H3	6514 I10	
2528 A11	6515 E13	
2529 G5	7500 A7	
2530 H3	7501 B6	
2531 H2	7502 A3	
2532 I3	7503 C7	
2533 D9	7504 C7	
2534 B9	7507 E7	
2535 H4	7511 E6	
2536 I4	7512 E5	
2537 I2	7518 D12	
2538 I3	7519 E11	
2543 A5	7520 F12	
2544 A4	7521 G5	
2550 E5	7522 G7	
2551 E5	7523 F7	
2557 E8	7524 H7	
2558 E8	7525 H9	
2559 E10	7526 G9	
2560 F10	7527 I9	
3500 A6	7528 I11	
3501 A6	7529 H12	
3502 A5	F500 B2	
3503 B6	F501 C4	
3504 A3	F502 B2	
3505 B6	F503 B2	
3506 B5	F505 A12	
3507 C5	F506 A12	
3508 A3	F507 A12	
3509 C7	F509 E13	
3510 C6	F512 D5	
3511 C7	F514 E9	
3512 A11	F516 D13	
3513 A11	F517 B13	
3514 D7	F518 G10	
3515 D6	F519 G12	
3516 D7	F521 H12	
3517 D6	I500 A6	
3519 F2	I501 A3	
3520 G2	I502 A6	
3521 H2	I503 B5	
3522 I2	I504 B7	
3523 A11	I505 B7	
3526 D8	I506 B6	
3527 B8	I507 B4	
3528 A5	I508 B5	
3530 G4	I509 B4	
3533 H3	I510 C2	
3539 I3	I511 C7	
3543 G7	I512 C7	
3544 H9	I513 C6	
3545 I11	I514 D7	
3547 F3	I515 C4	
3548 E7	I516 D8	
3557 E5	I517 D7	
3558 E5	I518 D6	
3559 E6	I520 G2	
3560 E4	I521 G2	
3561 E6	I522 G2	
3562 F5	I523 G2	
3569 E8	I524 A3	
3572 D7	I526 H7	
3573 D12	I528 H4	
3574 D12	I529 H9	
3575 E11	I531 I4	
3576 E12	I532 E3	
3577 E12	I533 G4	
3578 E10	I534 H3	
3579 E11	I535 I3	
3580 E12	I537 E8	
3581 F10	I538 E4	
3582 F11	I539 F7	
3583 F6	I540 H11	
3584 F7	I541 G5	
3585 F8	I542 G6	
3586 G7	I543 D5	
3587 G7	I544 E5	
3588 G8	I545 E5	
3589 G8	I546 E6	
3590 G9	I547 F6	
3591 H9	I548 E5	
3592 H9	I549 F5	
3593 H10	I550 H8	
3594 H11	I551 G5	
3595 H12	I552 I11	
3596 I11	I553 G7	
3597 I12	I554 F8	
3598 E12	I557 I9	
4503 F6	I558 G9	
4505 E8	I559 H11	

IBO Zapper Panel: Front End



1600 A2
1601 F6
1603-1 H13
1603-2 H12
2607 D10
2608 D9
2609 D9
2610 D10
2611 D10
2612 D10
2613 D11
2614 D11
2615 D8
2617 D8
2618 D10
2619 D11
2620 D11
2621 D11
2622 D3
2623 D4
2624 E13
2625 D7
2626 E2
2627 E5
2628 F6
2629 F7
2630 F1
2631 F6
2632 F5
2633 G5
2634 G6
2635 H4
2636 D2
2637 D2
3606 C4
3607 C4
3608 E8
3609 E6
3610 E6
3611 E4
3612 E1
3613 E2
3614 E6
3615 E6
3616 F4
3617 F6
3618 F5
3619 F5
3620 G3
3621 G8
3622-1 G11
3622-2 G11
3622-3 G11
3622-4 G11
3623 G3
3624-1 G11
3624-2 G11
3624-3 G11
3624-4 G11
3625 G8
3626 G5
3627 G5
3629 G8
3630 H8
3631 H8
3632 H5
3633 H5
3634 I3
3635 E11
3636 C6
3637 C6
3638 C7
3639 C7
3640 D6
3641 D6
3642 D7
3643 D7
3644-1 G11
3644-2 H11
3644-3 H11
3644-4 H11
3645 G8
4605 E7
4606 E3
4607 E5
4610 I3
4611 C3
5600 C10
5601 D13
5602 D3
5603 H4
5604 C2
7600 E8
7601-1 E2
7601-2 F2
7602 H4
7605 C6
7606 D6
F600 C2
F603 D3
F604 F5
F605 F5
F606 F5
F607 F7
F608 F7
F609 F8
F610 G7
F611 H5
F612 H5
F613 I3
I601 D4
I602 C5
I603 H12
I604 E8
I605 E4
I606 E5
I607 E6
I614 G8
I615 G12
I616 G4
I618 G12
I619 G12
I620 G12
I621 G12
I622 G12
I623 G12
I624 G12
I625 G12
I626 H12
I627 H12
I628 H11
I629 H11
I631 E7
I632 E2
I633 C7
I634 D7
I635 C3

IBO Zapper Panel: Common Interface

K7 COMMON INTERFACE

PCMCIA CONTROLLER

I²C INTERFACE

TS INTERFACE

INTERRUPTS MANAGEMENT

UCSG

LATCH 7701 74LVC573ADB

LATCH 7702 74LVC573ADB

68p PCMCIA CONNECTOR

BUS TRANSCEIVER 7703 74LVC245A

CURRENT SWITCH 7705 ST890C

ICM668H-D1121NS

68R PROCESS CHIP

MIU_ADDR(0:24)

A_MDI(0:7)

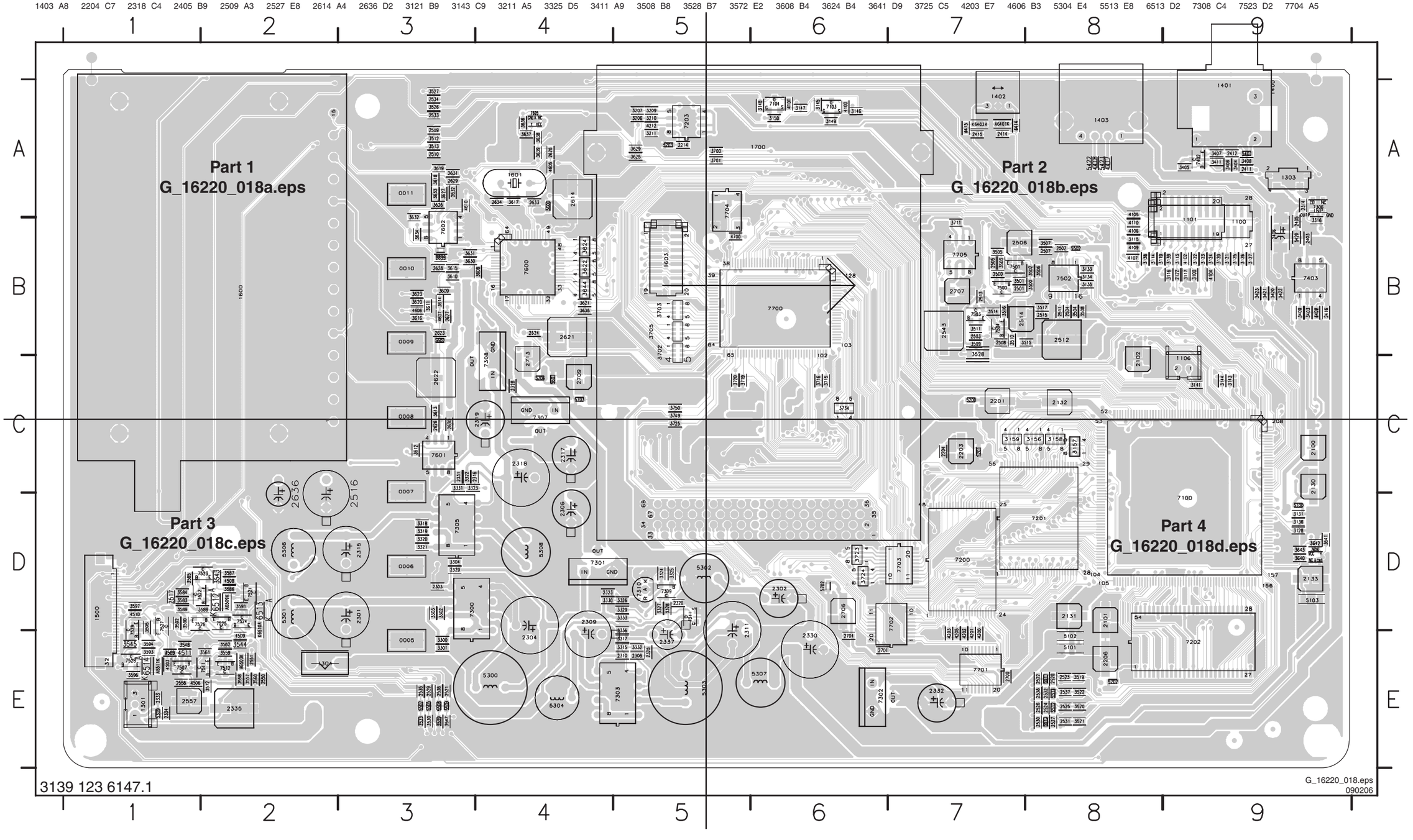
PCMCIA_A(0:14)

PCMCIA_D(0:7)

G_16220_017.eps
070206

Layout IBO Zapper Panel (Overview Top Side)

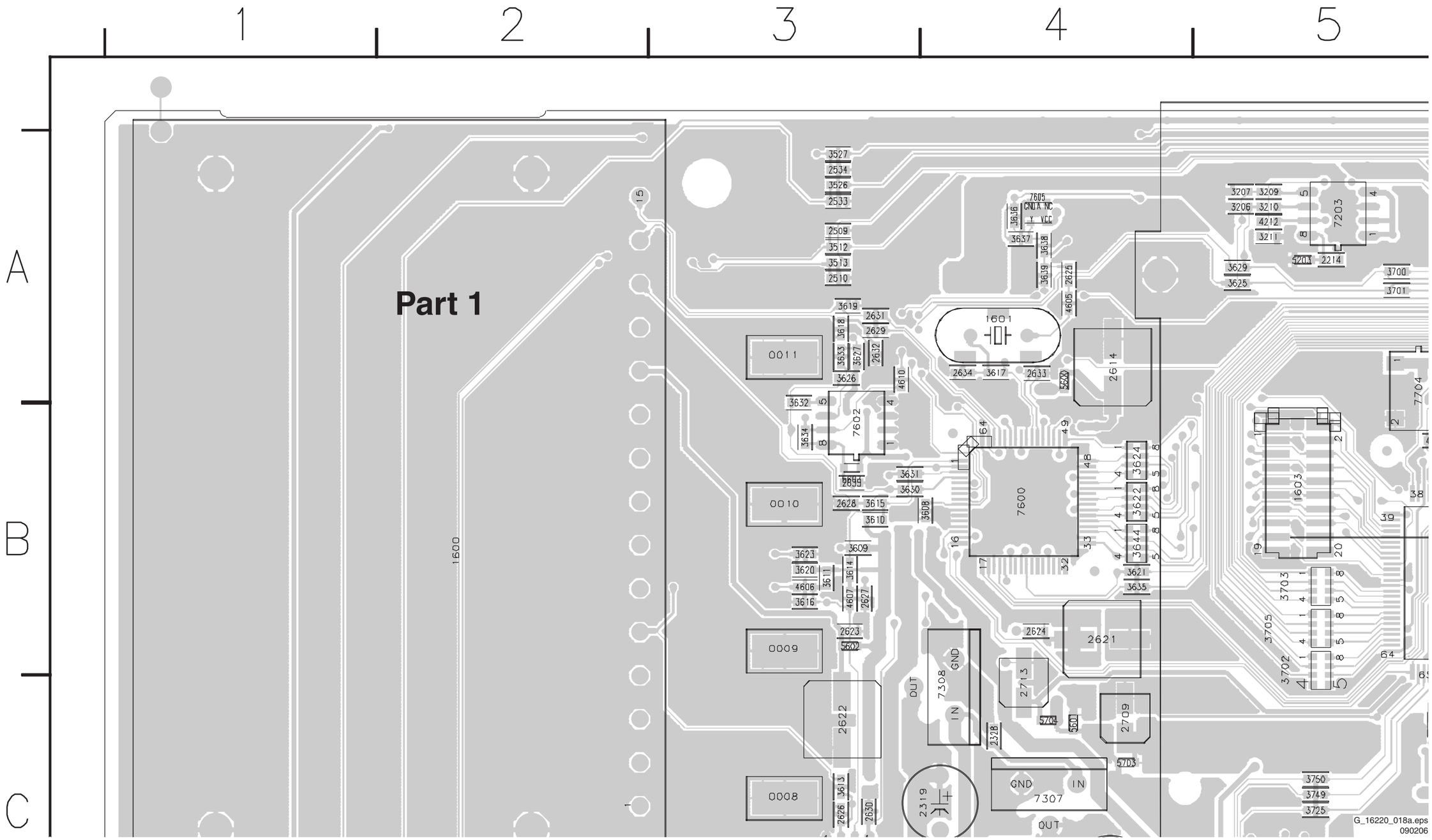
0005	E3	1500	D1	2206	E8	2319	C4	2406	B9	2510	A3	2529	E3	2621	B4	2700	E7	3122	B9	3144	C9	3300	E3	3326	D5	3414	A7	3509	B7	3530	E3	3583	D1	3609	B3	3625	A5	3642	D9	3734	C6	4205	E7	4607	B3	5306	D2	5514	E8	6514	E1	7309	D5	7524	D2	7705	B7
0006	D3	1600	B2	2214	A5	2320	D5	2411	A9	2511	B8	2530	E8	2622	C3	2701	E6	3123	B9	3145	A6	3301	E3	3327	D5	3415	A7	3510	B7	3533	E3	3584	D1	3610	B3	3626	A3	3643	D9	3749	C5	4212	A5	4610	A3	5307	E6	5600	A4	7100	D9	7310	D5	7525	D2		
0007	C3	1601	A4	2301	D3	2323	D4	2412	A9	2512	B8	2531	E8	2623	B3	2704	E6	3124	B9	3146	A6	3302	D3	3328	D5	3420	B9	3511	B7	3539	E3	3585	D1	3611	B3	3627	A3	3644	B4	3750	C5	4402	B9	4700	B5	5308	D4	5601	C4	7103	A6	7311	D5	7526	D1		
0008	C3	1603	B5	2302	D6	2325	E5	2414	A7	2513	B7	2532	E8	2624	B4	2706	D6	3125	B9	3147	A6	3303	D3	3329	D5	3421	B9	3512	A3	3543	D2	3586	D2	3612	C3	3629	A5	3700	A5	4100	A6	4414	A7	5100	D9	5309	E1	5602	B3	7104	A6	7402	A9	7527	D1		
0009	B3	1700	A6	2303	D3	2328	C4	2415	A7	2514	B7	2533	A3	2625	A4	2707	B7	3126	B9	3148	A6	3304	D3	3330	D4	3422	B9	3513	A3	3544	E2	3587	D2	3613	C3	3630	B3	3701	A5	4101	A6	4415	A7	5101	E8	5401	A9	5603	B3	7200	D7	7403	B9	7528	E1		
0010	B3	2100	C9	2304	E4	2329	D3	2416	B9	2515	B8	2534	A3	2626	C3	2709	C4	3127	B9	3149	A6	3315	E5	3331	C3	3423	B9	3514	B7	3545	E1	3588	D2	3614	B3	3631	B3	3702	B5	4102	B9	4417	A8	5102	E8	5420	B9	5702	D6	7201	D8	7500	B7	7529	D1		
0011	A3	2101	D8	2306	D4	2330	E6	2500	B7	2516	D3	2535	E3	2627	B3	2713	C4	3128	D9	3150	A6	3316	B9	3332	E5	3424	B9	3515	B8	3547	E3	3589	D1	3615	B3	3632	A3	3703	B5	4104	B9	4418	A8	5103	D9	5421	A8	5703	C4	7202	E9	7501	B7	7600	B4		
1100	B9	2102	C8	2308	E5	2331	C3	2501	B7	2517	D1	2536	E3	2628	B3	3100	B9	3131	D9	3156	C8	3317	E5	3333	D5	3500	B8	3516	B7	3548	E1	3590	D1	3616	B3	3633	A3	3705	B5	4105	A8	4503	E1	5200	C7	5422	A8	5704	C4	7203	A5	7502	B8	7601	C3		
1101	B9	2122	B9	2309	D4	2332	E7	2502	B8	2520	E8	2537	E8	2629	A3	3113	B9	3133	B8	3157	C8	3318	D3	3403	B9	3501	B7	3517	B8	3557	E2	3591	D2	3617	A4	3634	B3	3711	B7	4106	B8	4505	E1	5201	C7	5502	B8	6401	A7	7300	D3	7503	B7	7602	B3		
1106	C9	2130	C9	2310	E5	2333	E1	2503	B7	2521	E3	2538	E8	2630	C3	3114	B8	3134	B8	3158	C8	3319	D3	3404	A9	3502	B8	3519	E8	3558	E2	3592	D1	3618	A3	3635	B4	3715	C6	4107	B8	4506	E1	5202	E8	5504	E3	6403	A7	7301	D4	7504	B7	7605	A4		
1301	E1	2131	D8	2311	E5	2334	E1	2504	B8	2522	E8	2543	B7	2631	A3	3115	B8	3135	B8	3159	C7	3320	D3	3405	A9	3503	B7	3520	E8	3559	E2	3593	E1	3619	A3	3636	A4	3716	C6	4109	B8	4508	D2	5203	A5	5505	E3	6503	E2	7302	E6	7507	E1	7606	D9		
1303	A9	2132	C8	2314	A9	2335	E2	2505	B7	2523	E8	2550	E2	2632	A3	3116	B9	3136	D9	3206	A5	3321	D3	3406	A9	3504	B8	3521	E8	3560	E2	3594	E1	3620	B3	3637	A4	3719	C5	4110	B8	4509	E2	5300	E4	5507	E3	6509	D2	7303	E5	7511	E2	7700	B6		
1304	E2	2133	D9	2315	D3	2336	E5	2506	B7	2524	E8	2551	E2	2633	A4	3117	B9	3138	B8	3207	A5	3322	C3	3407	A9	3505	B7	3522	E8	3561	E2	3595	D1	3621	B4	3638	A4	3720	C5	4200	E7	4510	D1	5301	D2	5508	E3	6510	D2	7305	D3	7512	E2	7701	E7		
1401	A9	2201	C7	2316	C3	2337	E5	2507	B8	2525	E8	2557	E1	2634	A4	3119	B8	3139	B9	3209	A5	3323	C3	3408	A9	3506	B8	3526	A3	3562	E2	3596	E1	3622	B4	3639	A4	3723	D6	4201	E7	4511	E1	5302	D5	5511	E8	6511	E1	7306	A9	7521	D2	7702	D7		
1402	A7	2203	C7	2317	C4	2403	B9	2508	B7	2526	E8	2558	E1	2635	B3	3120	B9	3141	C9	3210	A5	3324	D5	3409	B9	3507	B8	3527	A3	3569	E1	3597	D1	3623	B3	3640	D9	3724	D6	4202	E7	4605	A4	5303	E5	5512	E8	6512	D2	7307	C4	7522	D1	7703	D7		
1403	A8	2204	C7	2318	C4	2405	B9	2509	A3	2527	E8	2614	A4	2636	D2	3121	B9	3143	C9	3211	A5	3325	D5	3411	A9	3508	B8	3528	B7	3572	E2	3608	B4	3624	B4	3641	D9	3725	C5	4203	E7	4606	B3	5304	E4	5513	E8	6513	D2	7308	C4	7523	D2	7704	A5		



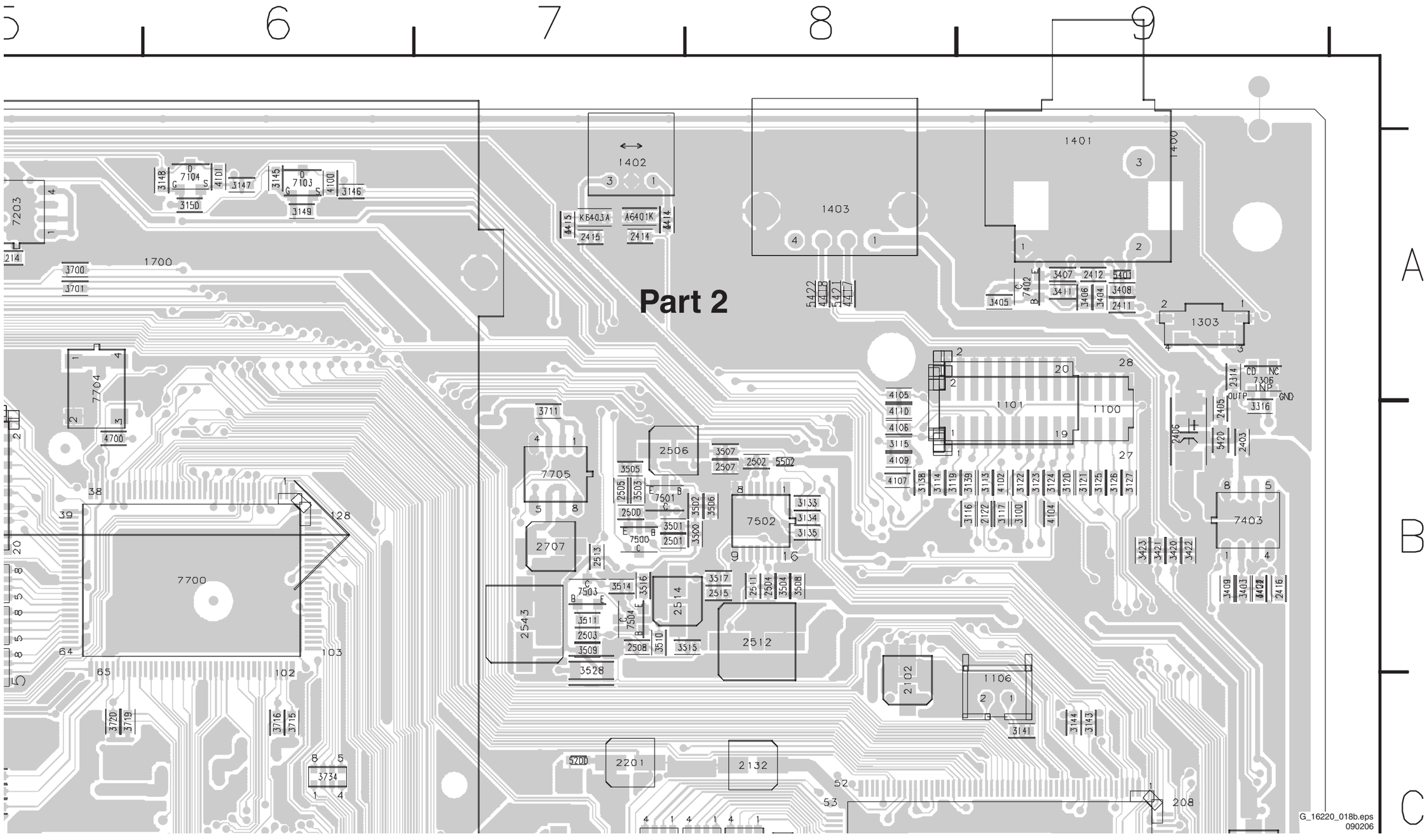
3139 123 6147.1

G_16220_018.eps
090206

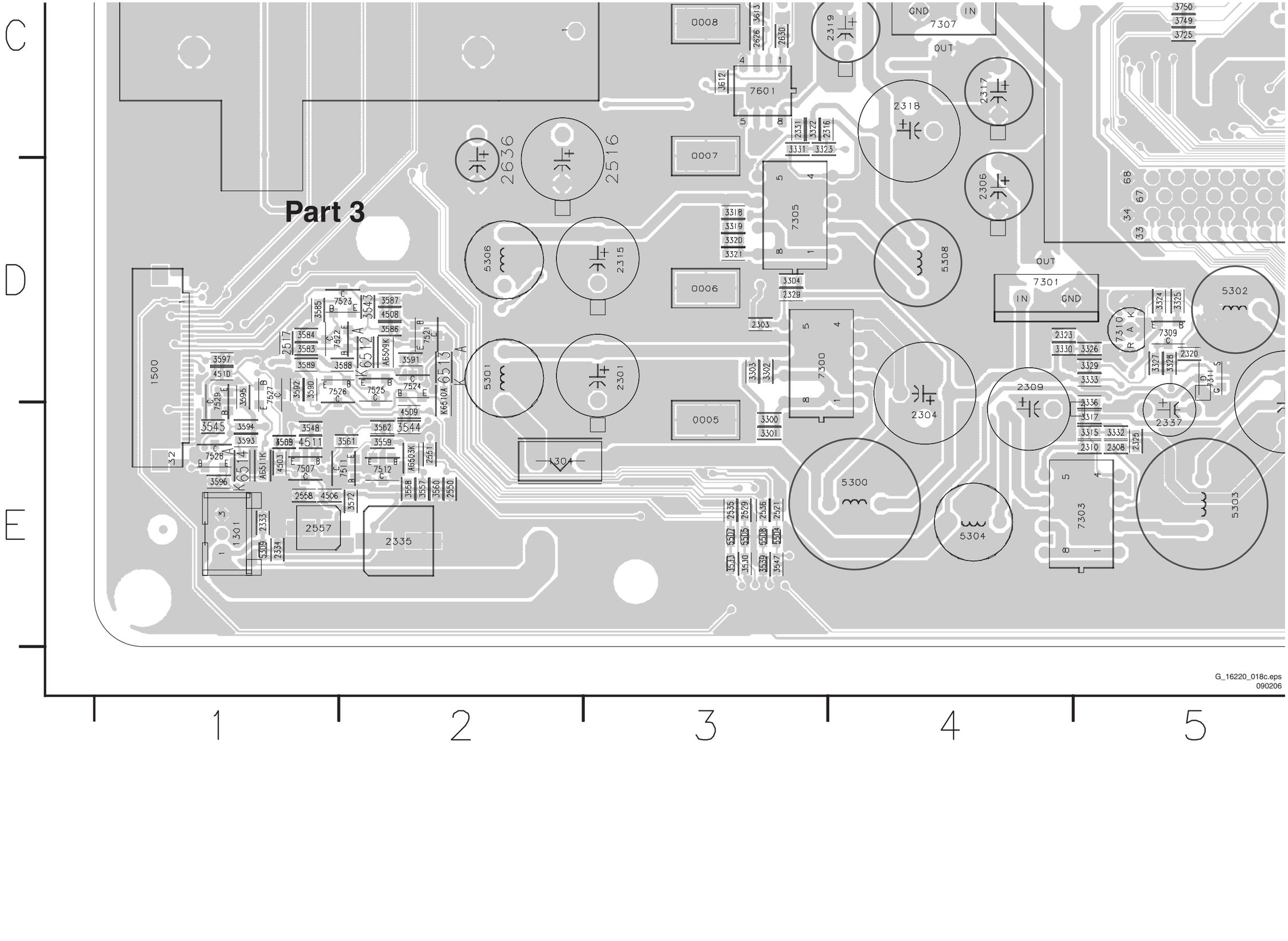
Layout IBO Zapper Panel (Part 1 Top Side)



Layout IBO Zapper Panel (Part 2 Top Side)

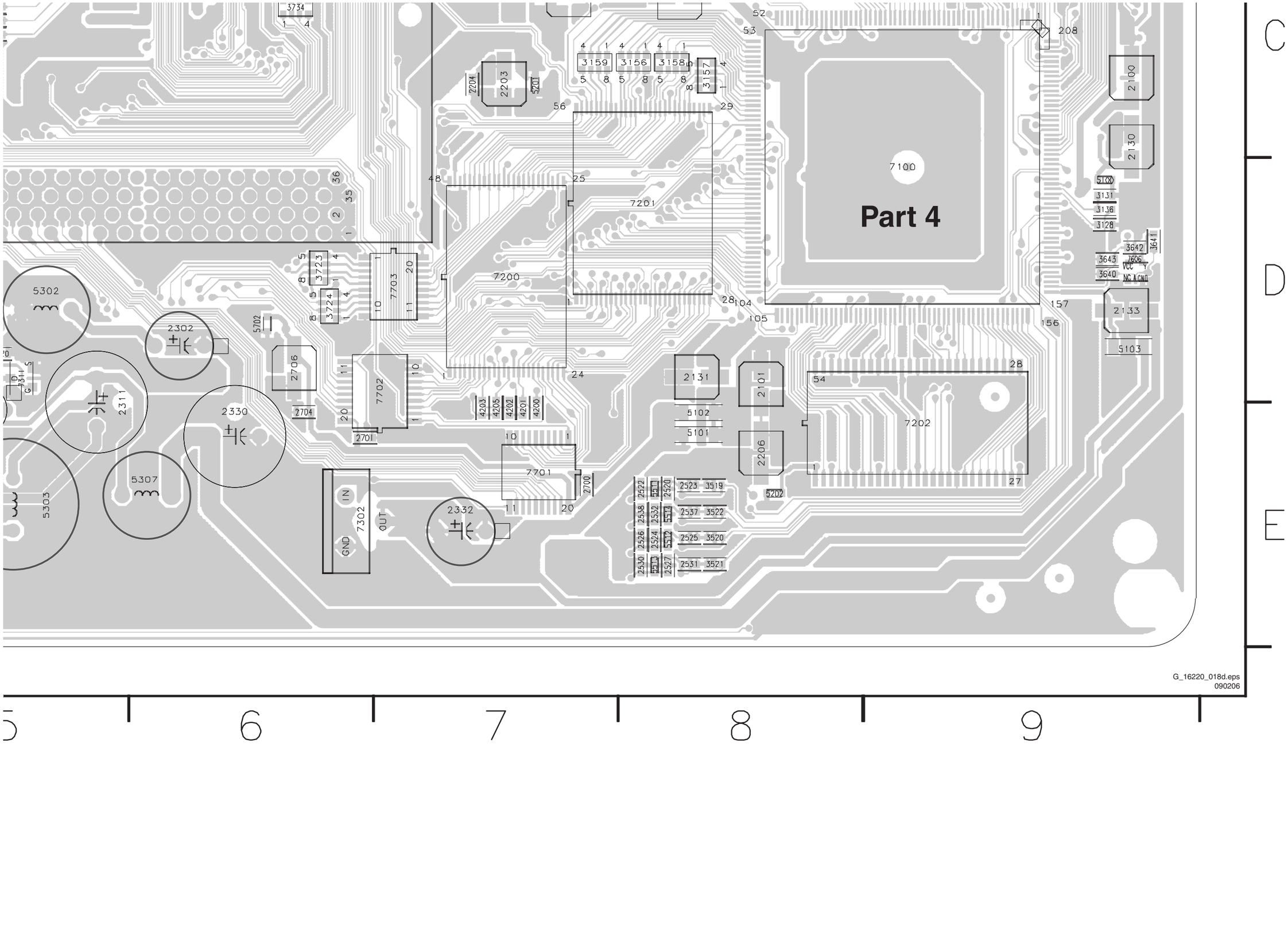


Layout IBO Zapper Panel (Part 3 Top Side)



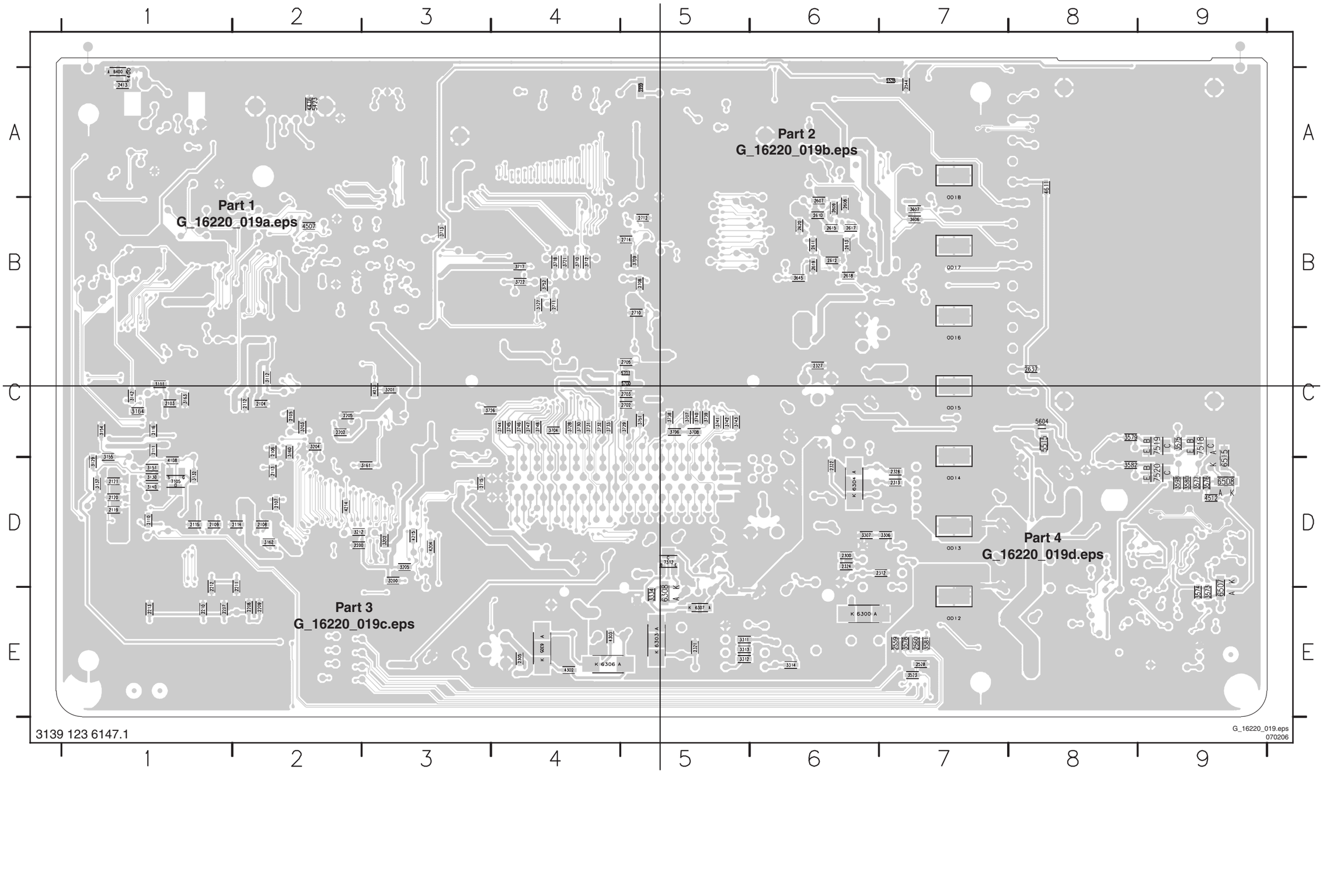
G_16220_018c.eps
090206

Layout IBO Zapper Panel (Part 4 Top Side)

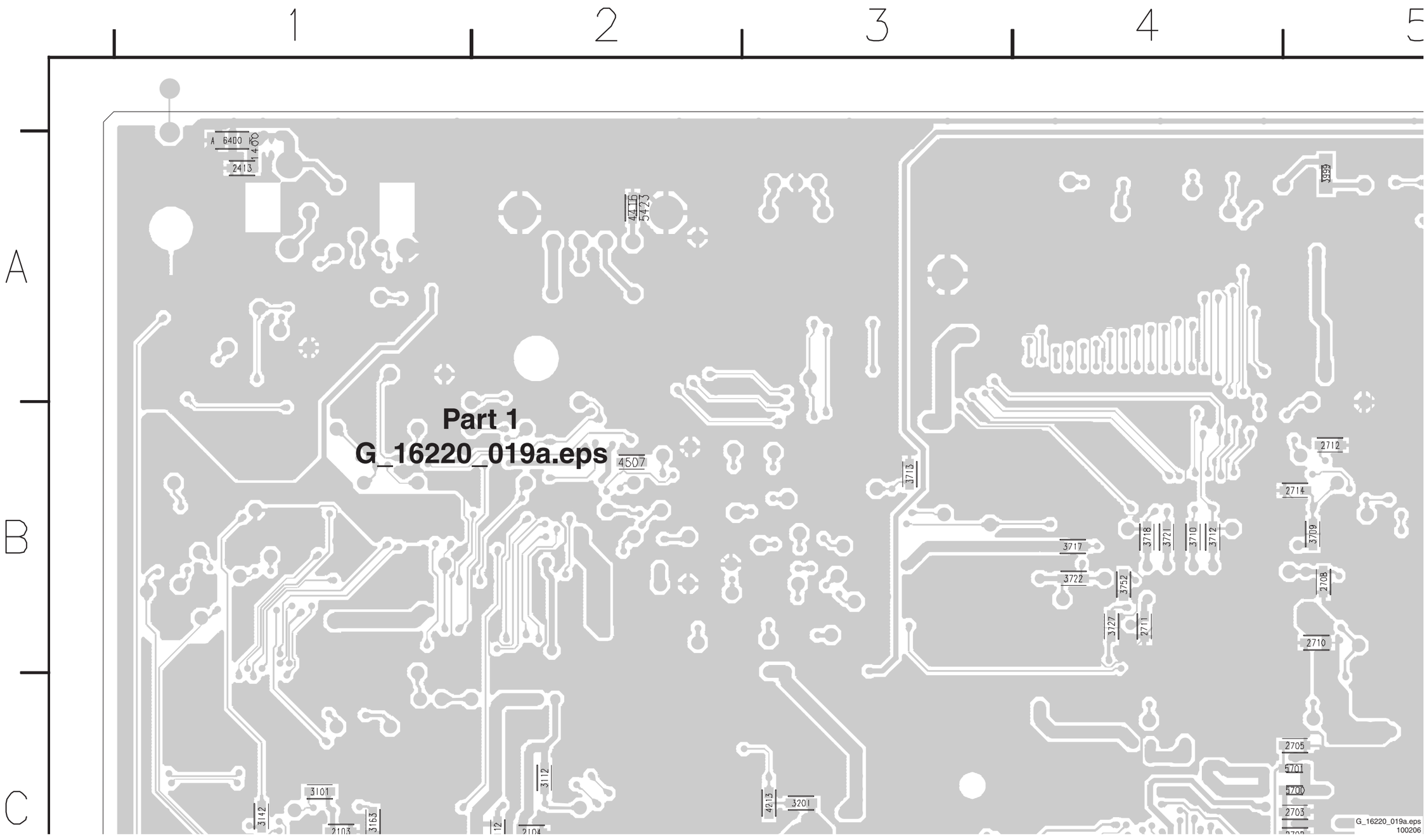


Layout IBO Zapper Panel (Overview Bottom Side)

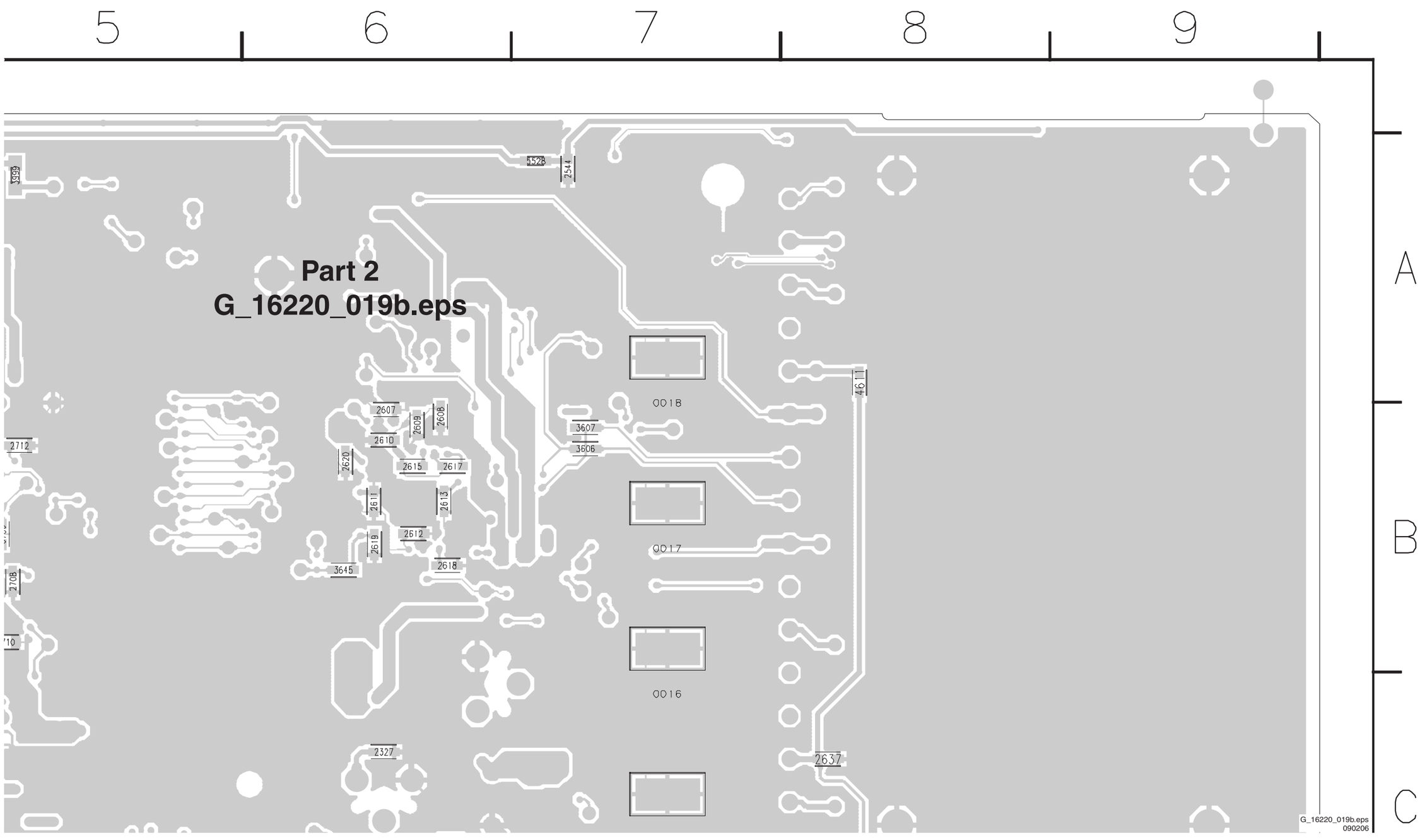
2103 C1 2104 C2 2105 C2 2106 C2 2107 D2 2108 D2 2109 D1
2110 D1 2111 C1 2112 C2 2113 D2 2114 D2 2115 D1 2116 C1
2119 D1 2120 D1 2121 D1 2200 D2 2202 C2 2205 C2 2207 E1
2208 E2 2209 E2 2210 E1 2211 D2 2212 D1 2213 E1 2300 D6
2305 E4 2312 D7 2313 D7 2321 E5 2322 D6 2324 D6 2326 D7
2327 C6 2413 A1 2528 E7 2544 A7 2559 E7 2560 E7 2607 B6
2608 B6 2609 B6 2610 B6 2611 B6 2612 B6 2613 B6 2615 B6
2617 B6 2618 B6 2619 B6 2620 B6 2637 C8 2702 C5 2703 C5
2705 C5 2708 B5 2710 B5 2711 B4 2712 B5 2714 B5 2715 D3
3101 C1 3112 C2 3129 D1 3130 D1 3132 D1 3137 D1 3140 D1
3142 C1 3151 D1 3154 C1 3155 C1 3160 C2 3161 D3 3162 D2
3163 C1 3164 C1 3200 D3 3201 C3 3202 D3 3203 C2 3204 C2
3205 D3 3212 D2 3306 D7 3307 D6 3311 E5 3312 E5 3313 E5
3314 E6 3334 E5 3523 E7 3573 E9 3574 E9 3575 C9 3576 D9
3577 D9 3578 E7 3579 C8 3580 D9 3581 E7 3582 D8 3598 D9
3606 B7 3607 B7 3645 B6 3704 C4 3706 C5 3707 C5 3708 C5
3709 B5 3710 B4 3712 B4 3713 B3 3717 B4 3718 B4 3721 B4
3722 B4 3726 C3 3727 B4 3728 C4 3729 C5 3730 C4 3731 C4
3732 C4 3733 C4 3738 C5 3739 C5 3740 C5 3741 C5 3742 C5
3743 C5 3744 C4 3745 C4 3746 C4 3747 C4 3748 C4 3751 C5
3752 B4 3999 A5 4108 D1 4204 D3 4213 C3 4214 D2 4215 D3
4302 E4 4303 E4 4416 A2 4507 B2 4512 D9 4611 A8 5423 A2
5515 C8 5528 A7 5604 C8 5700 C5 5701 C5 6300 E6 6303 E5
6304 D6 6305 E4 6306 E4 6307 E5 6308 E5 6400 A1 6507 E9
6508 D9 6515 D9 7105 D1 7312 D5 7518 C9 7519 C9 7520 D9



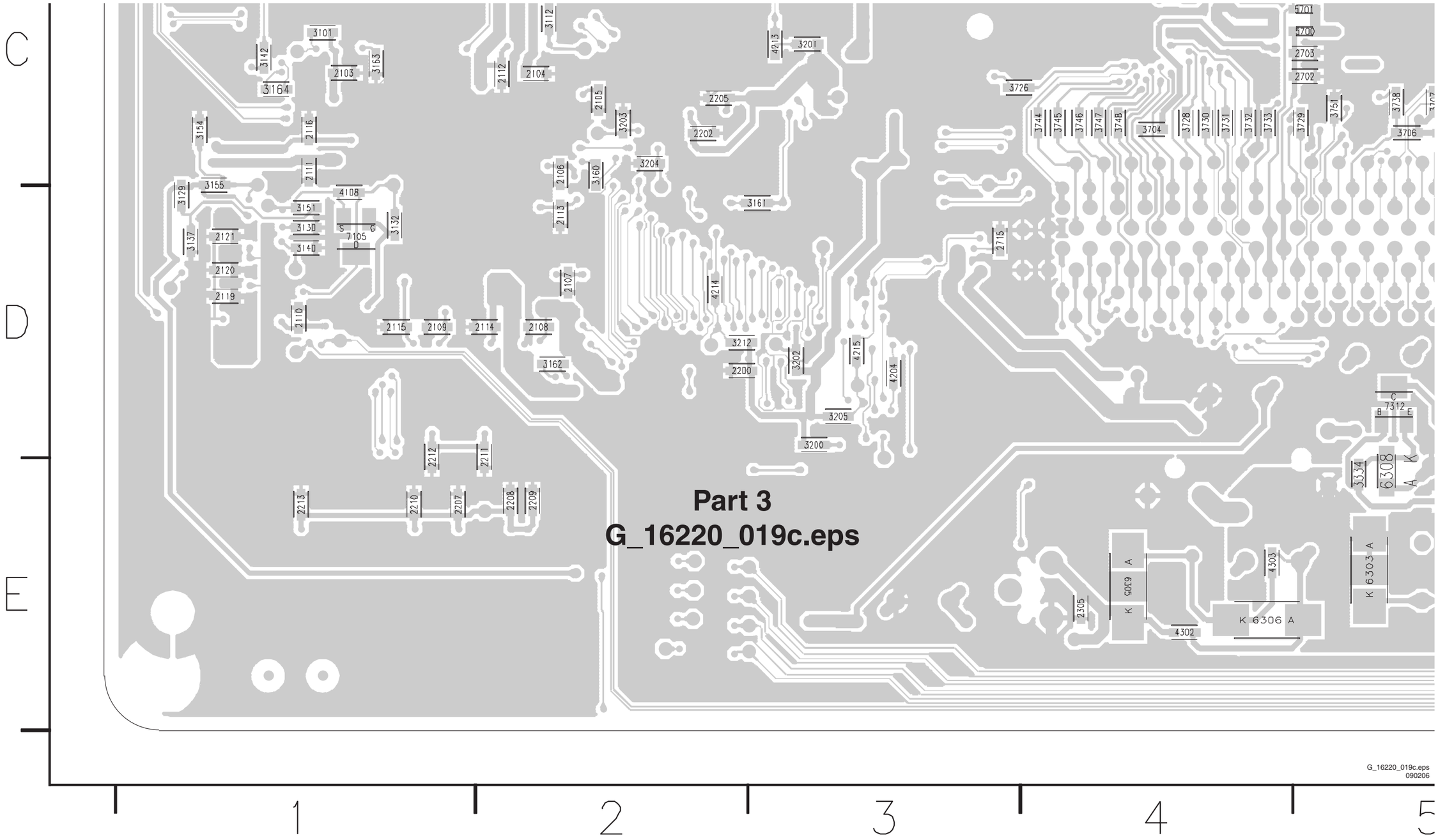
Layout IBO Zapper Panel (Part 1 Bottom Side)



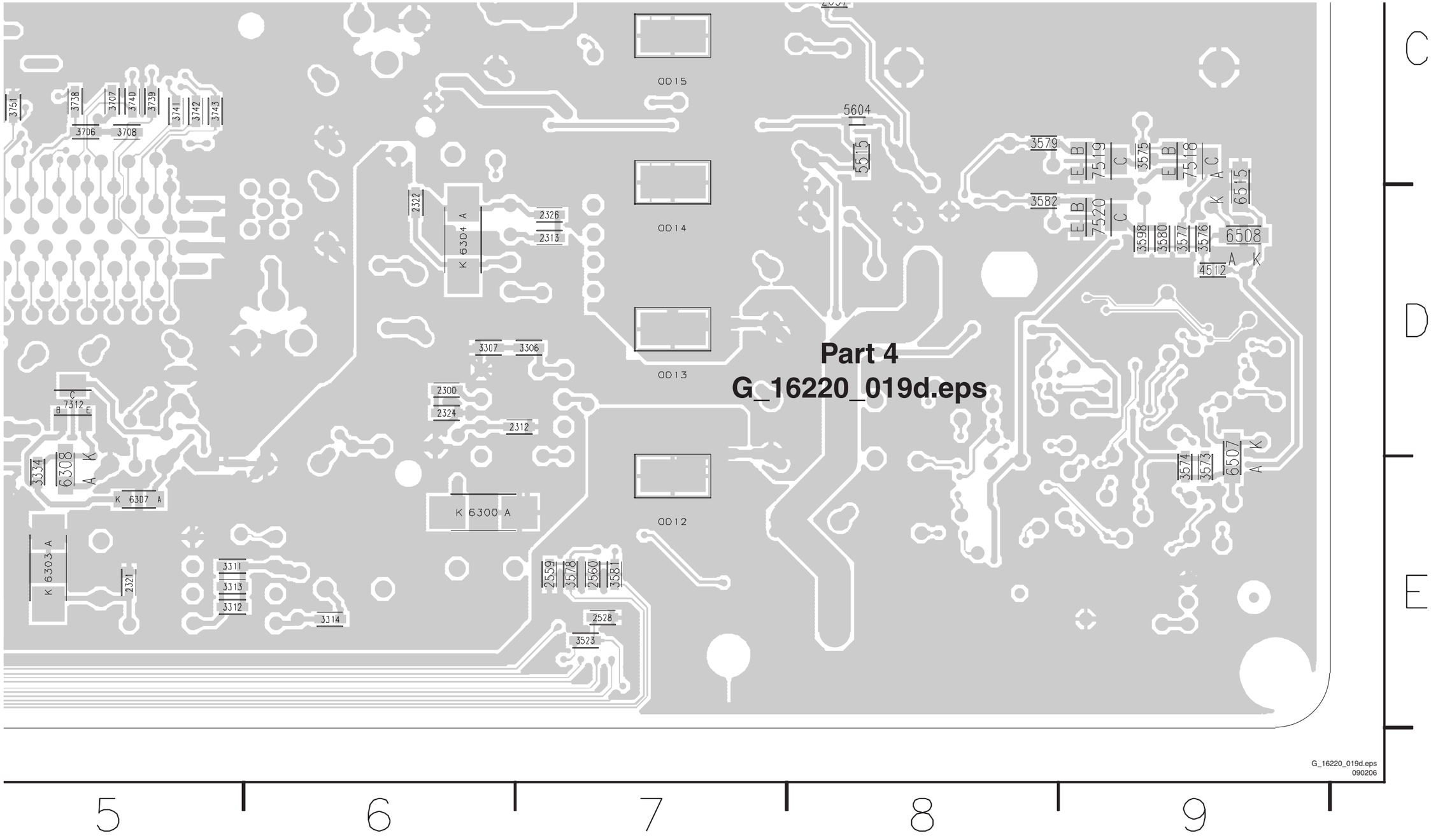
Layout IBO Zapper Panel (Part 2 Bottom Side)



Layout IBO Zapper Panel (Part 3 Bottom Side)



Layout IBO Zapper Panel (Part 4 Bottom Side)



G_16220_019d.eps
090206

Personal Notes:

E_06532_013.eps
131004

8. Alignments

Index of this chapter:

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:
Mains voltage and frequency: 110-240 V / 50/60 Hz (26 and 32"), 220-240 V / 50/60 Hz (37" and 42").
Allow the set to warm up for approximately 10 minutes.
Test probe: Ri > 10 MΩ; Ci < 2.5 pF.

8.2 Hardware Alignments

There are no hardware alignments foreseen for the IBO Zapper module.

8.3 Software Alignments

With the software alignments of the Service Alignment Mode (SAM) the geometry, white tone and tuner (IF) can be aligned.
To store the data: Use the RC button Menu to switch to the main menu and next, switch to 'Stand-by' mode.

8.3.1 ADC Gain and Grey Scale Alignment

The table below shows a number of NVM settings used for each model of TV set. Be sure to use the correct editor in the SAM menu (NVM Editor or SC NVM Editor), because the first one is used for the Hercules NVM, and the second one for the SCALER (SC) part of the TV set.

Caution:

- **Do not change the NVM settings without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!**
- **Do not change the Scaler NVM settings, as this will hamper the DVI / HDMI functionality of the TV set!**
- Always note down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

Table 8-1 ADC gain and grey scale alignment

SDTV ADC Gain settings: Use the NVM Editor in SAM to set these values in the Hercules NVM		
Setting	**Hercules NVM Address (decimal value)**	**26PF5521D/10/12 32PF5521D/10/12 37PF5521D/10 26PF7521D/10 32PF7521D/10 37PF7521D/10 42PF7421D/10**
NVM_ADC_GAIN_R	006	135
NVM_ADC_GAIN_G	007	185
NVM_ADC_GAIN_B	008	165

SDTV Greyscale settings: Use the SC NVM Editor in SAM to set these values in the Scaler NVM		
Setting	**Scaler NVM Address (decimal value)**	**26PF5521D/10/12 32PF5521D/10/12 37PF5521D/10 26PF7521D/10 32PF7521D/10 37PF7521D/10 42PF7421D/10**
ADC_RED_OFFSET2	338	070
ADC_GRN_OFFSET2	339	070
ADC_BLU_OFFSET2	340	070
ADC_RED_GAIN	341	150
ADC_GRN_GAIN	343	150
ADC_BLU_GAIN	345	150
PC Greyscale settings		
Setting	**Scaler NVM Address (decimal value)**	**26PF5521D/10/12 32PF5521D/10/12 37PF5521D/10 26PF7521D/10 32PF7521D/10 37PF7521D/10 42PF7421D/10**
ADC_RED_OFFSET2	325	070
ADC_GRN_OFFSET2	326	070
ADC_BLU_OFFSET2	327	070
ADC_RED_GAIN	328	240
ADC_GRN_GAIN	330	240
ADC_BLU_GAIN	332	240
HD Greyscale settings		
Setting	**Scaler NVM Address (decimal value)**	**26PF5521D/10/12 32PF5521D/10/12 37PF5521D/10 26PF7521D/10 32PF7521D/10 37PF7521D/10 42PF7421D/10**
ADC_RED_OFFSET2	351	064
ADC_GRN_OFFSET2	352	075
ADC_BLU_OFFSET2	353	064
ADC_RED_GAIN	354	180
ADC_GRN_GAIN	356	180
ADC_BLU_GAIN	358	180

8.3.2 Panel Size Settings

The table below shows the NVM settings for panel selection, based on panel size and manufacturer. Use the SC NVM editor in the SAM menu to change the panel code at decimal address 320.

Caution:

- **Make sure to choose the right panel, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!**
- Always note down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

Table 8-2 Panel size settings

Option table for panel size settings		
Manufacturer	**Size (inch)**	**Panel code (hex)**
LPL	26	1A
LPL	32	0F
LPL	37	0E
LPL	42	22
Sharp	26	11
Sharp	32	10
AUO	26	08
AUO	32	09
AUO	37	0A

8.3.3 Options

Options OP1...OP7 in the SAM menu can be used for quickly restoring 64 features or settings of the HERCULES part of the TV set to their original default factory values (8 groups of 8 features/settings each). When the decimal value of one option byte OP1...OP7 is changed (see the first table below) then a group of 8 bits, representing 8 HERCULES options or features, is changed as well (see the second table below for a detailed description of the features or settings that are changed).
The second table shows which option byte (OP1...OP7) represents which group of 8 option bits. Each bit (0...7) switches a particular HERCULES feature or setting ON or OFF, depending on its value (1 or 0).
It is also possible to change the features or settings mentioned in the second table directly at bit level, by means of the NVM Editor in the SAM menu. In the NVM Editor, first the correct NVM address (ADR) has to be entered, then the correct value (VAL, 1 or 0) for each bit (see second table), and finally the settings have to be stored (STORE). For quickly restoring the HERCULES part of the TV set to its original factory settings, however, it is more convenient to simply enter the default factory settings OP1...OP7 that are given in the first table below. How to do this, is described in the next paragraph.

How to Change an Option Byte

As has been explained above, an Option byte (OP) represents a number of different HERCULES options. Changing these bytes directly makes it possible to set all HERCULES options very fast. All options are controlled via seven option bytes. Select the option byte (OP1.. OP7) with the Menu Up/ Down keys, and enter the new (decimal) value. For the correct Factory Default settings, see the first table below. For more detailed information, see the second table.

Leaving the Option submenu saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched “off” and “on” with the AC power switch (cold start).

Table 8-3 Option codes OP1...OP7

Option table for quickly restoring the HERCULES to its Factory Default settings			
Model number	**26PF5521D/10/12 32PF5521D/10/12**	**37PF5521D/10**	**26PF7521D/10 32PF7521D/10 37PF7521D/10 42PF7421D/10**
OP1	156	156	156
OP2	231	231	231
OP3	47	47	111
OP4	81	113	113
OP5	252	252	252
OP6	27	27	27
OP7	19	19	19
Options (can be changed only via the SAM menu)	**Total decimal value for each option per model number**		

How to Change Options at Bit Level

If you wish to know which features or settings of the HERCULES are changed via OP1...OP7, or if you want to change each option or feature bit by bit, use the more detailed table below.

Note: the table below contains only part of the NVM settings that can be changed. A second range of settings and features can be found in Chapter 5 of this manual, in table **NVM Default values**. The settings mentioned there can only be changed via the NVM editor. For further settings, see also the table “ADC Gain and Grey scale alignment” elsewhere in this manual.

Table 8-4 Option codes in detail, at bit level

Option byte & bit table for restoring the TV set to its original Factory Default settings via the NVM Editor in the SAM menu				
	Model number	**26PF5521D/10/12 32PF5521D/10/12**	**37PF5521D/10**	**26PF7521D/10 32PF7521D/10 37PF7521D/10 42PF7421D/10**
OP1	**Description of feature/option to be switched ON or OFF**			
bit 7 (msb)	OP_PHILIPS_TUNER	1	1	1
bit 6	OP_FM_RADIO	0	0	0
bit 5	OP_LNA	0	0	0
bit 4	OP_ATS // for EU	1	1	1
bit 3	OP_ACI	1	1	1
bit 2	OP_UK_PNP	1	1	1
bit 1	OP_VIRGIN_MODE	0	0	0
bit 0 (lsb)	OP_CHINA	0	0	0
	Total DEC Value	156	156	156
	Total HEX Value	9C	9C	9C
OP2				
bit 7 (msb)	OP_HDMI-2X	1	1	1
bit 6	OP_IBEX (for DVB)	1	1	1
bit 5	OP_CHANNEL_NAMING	1	1	1
bit 4	OP_LTI (Lum Transcient Improvmt)	0	0	0
bit 3	OP_TILT	0	0	0
bit 2	OP_FINE_TUNING	1	1	1
bit 1	OP_BACKLIGHT_DIMMING (for Malibu only)	1	1	1
bit 0 (lsb)	OP_HUE	1	1	1
	Total DEC Value	231	231	231
	Total HEX Value	E7	E7	E7
OP3				
bit 7 (msb)	OP_EW_FUNCTION	0	0	0
bit 6	OP_PIXEL_PLUS (for Option A)	0	0	1
bit 5	OP_SCL_RECOVERY	1	1	1
bit 4	OP_SPLITTER // temp	0	0	0
bit 3	OP_VIRTUAL_DOLBY	1	1	1
bit 2	OP_WIDE_SCREEN	1	1	1
bit 1	OP_WSSB	1	1	1
bit 0 (lsb)	OP_OP_ME5 // OP_ME5 - 5/6 local buttons implementation	1	1	1
	Total DEC Value	47	47	111
	Total HEX Value	2F	2F	6F
OP4				
bit 7 (msb)	OP_LIP_SYNC (for PDP only)	0	0	0
bit 6	OP_HD	1	1	1
bit 5	OP_1000P_TEXT	0	1	1
bit 4	OP_DELTA_VOLUME	1	1	1
bit 3	OP_TAIWAN_KOREA	0	0	0
bit 2	OP_VOLUME_LIMITER	0	0	0
bit 1	OP_STEREO_DBX	0	0	0
bit 0 (lsb)	OP_STEREO_NICAM_2CS	1	1	1
	Total DEC Value	81	113	113
	Total HEX Value	51	71	71
OP5				
bit 7 (msb)	OP_AV1	1	1	1
bit 6	OP_AV2	1	1	1
bit 5	OP_AV3	1	1	1
bit 4	OP_CVI	1	1	1
bit 3	OP_SVHS2	1	1	1
bit 2	OP_SVHS3	1	1	1
bit 1	OP_HOTEL_MODE	0	0	0
bit 0 (lsb)	OP_SIMPLY_FACTORY=OP_BTSC_AVSTEREO	0	0	0
	Total DEC Value	252	252	252
	Total HEX Value	FC	FC	FC
OP6				
bit 7 (msb)	OP_PERSONAL_ZAPPING	0	0	0
bit 6	OP_SMART_SURF	0	0	0
bit 5	OP_FMTRAP	0	0	0
bit 4	OP_COMBFILTER	1	1	1
bit 3	OP_ACTIVE_CONTROL	1	1	1
bit 2	OP_VIDEO_TEXT	0	0	0
bit 1	OP_LIGHT_SENSOR	1	1	1
bit 0 (lsb)	OP_TWIN_TEXT	1	1	1
	Total DEC Value	27	27	27
	Total HEX Value	1B	1B	1B
OP7				
bit 7 (msb)	OP_TIME_WIN1	0	0	0
bit 6	OP_DVB_USB = OP_MALAY	0	0	0
bit 5	OP_AMBILIGHT	0	0	0
bit 4	OP_COLUMBUS	1	1	1
bit 3	OP_DUMMY6	0	0	0
bit 2	OP_DUMMY7	0	0	0
bit 1	OP_WEST_EU	1	1	1
bit 0 (lsb)	OP_MULTI_STANDARD_EUR	1	1	1
	Total DEC Value	19	19	19
	Total HEX Value	13	13	13

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

Note:

- Only information that is related ito the IBO Zapper 2 module is published in this manual. For the other information, see the relevant chassis manual (order code on front page).

9.1 Introduction

The LC4.31 chassis is a global chassis for the year 2006. It is the successor of the LC4.3 chassis and covers screen sizes of 26, 32, 37 and 42 inch (in 16:9 ratio). It has two new stylings, called ME5FL and ME6 (see front page). There are two different picture qualities available, depending on the model: Pixel Plus in the xxPF7x21/10 models, and Digital Crystal Clear in the xxPF5321/10 and /12 models.

The Digital Video Broadcasting (DVB) TV sets/models discussed in this manual are a combination of a standard TV set and an IBO Zapper 2 module.

9.2 IBO Zapper 2 Module

The “IBO Zapper 2” module is meant to receive, process, and transfer Digital Video Broadcasting-Terrestrial (DVB-T) signals to the internal TV interface for audio, video, and control. The “IBO Zapper 2” is intended for use in combination with an analogue TV chassis.
Differences with respect to the earlier version of the IBO zapper module are:

- The PCMCIA connector is different.
- The USB connector has been removed.

9.3 Block diagram IBO Zapper 2 Module

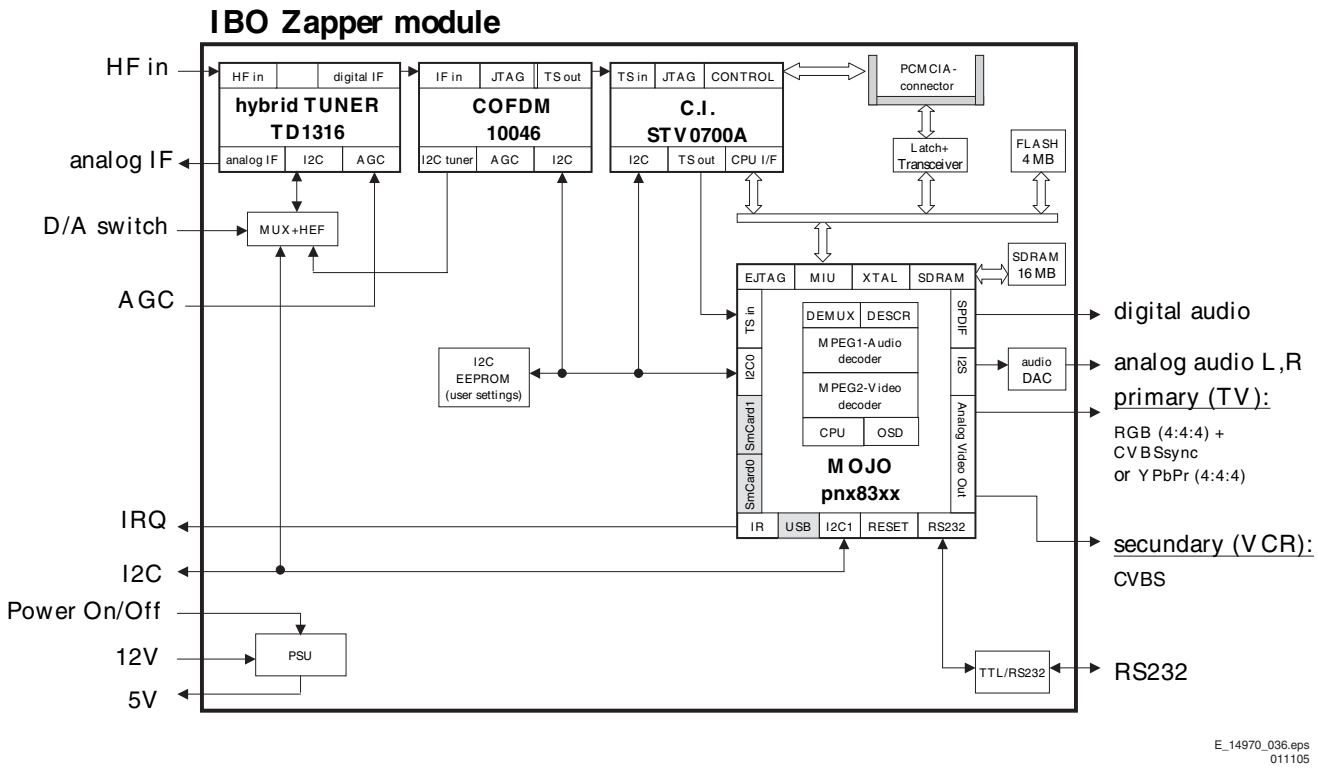


Figure 9-1 Block Diagram IBO zapper 2 module

9.4 PNx83xx MOJO

The MOJO is a source decoder chip targeted for very low cost application in integrated digital televisions.The device contains all hardware and software to be able to decode and display MPEG2 transport streams, including:

- Descrambling
- Demultiplexing
- Audio / video decompression
- Video encoding.
- Overlay graphics provisions

Some features of the MOJO are:

- 32-bit PR1910 core operating at 120 MHz.
- 16-bit memory and peripheral interface to connect ROM, NOR Flash and various peripherals.
- Sixteen external interrupt inputs shared with PIO lines.
- Several embedded peripheral units with physical interfaces to:
  - Two UART (RS-232) data ports
  - Two I^2C master / slave transceivers
  - Two smart-card reader interfaces
  - One Integrated Conditional Access Module interface
- Supports parallel and serial transport stream input interfaces

9.5 Front End

The front end of the “IBO Zapper” module is almost identical to the “IBO+” module as used in the A10E with the exception that the Transport Streams that come from the COFDM demodulator are now fed through the PCMCIA controller first. The PCMCIA controller receives encrypted Transport Streams from the COFDM demodulator. Via the PCMCIA card, these encrypted Transport Streams are decrypted, and transported to the MOJO.

9.6 Back End

The MOJO is the main building block of the back-end of the “IBO Zapper” module. The IC decodes the MPEG-2 stream into analogue video and digital audio.

9.6.1 Transport Stream Input

The Transport Stream input is according to MPEG2 standard. In the “IBO Zapper 2”, only 8-bit parallel is supported. The used TS names are TDA_DATA.

9.6.2 Video Outputs

The MOJO has two analogue video outputs:

- Primary (TV): YUV + RGB
- Secundary (VCR): CVBS

The primary MOJO output is used as input for the TV display and is fed either to the Hercules YUV/RGB input (pins 78/79/80), for teletext insertion purposes, or directly to the analogue Scaler input D2/C2/B2. The signal path is as follows:
switch 7G09 chooses between the SCART1 input signal and the YUV/RGB output of the MOJO. The signal selected by switch 7G09 is passed on to one group of the inputs of switch 7E00. The other group of inputs of this switch is connected to the three analogue input pins of the DVI-D connector. The output signal of switch 7E00 is passed on to the Hercules input, pins 78/79/80 and to the Scaler input D2/C2/B2 via switch 7E01 in the MUX-SYNC interface. This switch chooses between the MOJO output signal and the Hercules output signal, which is used for SDTV signals (analogue terrestrial TV reception via the analogue receiving part). The Hercules output is not only used for SDTV signals, but also for MOJO output signals that were first sent to the Hercules input for e.g. teletext reinsertion purposes before they are passed on to the Scaler.
The secundary MOJO output, which delivers CVBS signals, is used for monitoring purposes or for recording via the SCART 2 output of the TV set. The signal path of the secundary MOJO output is as follows:
the CVBS/VCR signal coming from the MOJO is sent to the Hercules video switch input, pin 58, via switch 7G07. The signal then appears on one of the outputs of the Hercules video switch, pin 48, and is passed on via switches 7219 and 7G10 to pin 19 of SCART 2, which is the CVBS/monitor output.
For further details, see the manuals of the original TV sets on which the various models of IBO zappers are based.

9.6.3 Audio Outputs

The MOJO has two audio output interfaces:

- SPDIF Out: The SPDIF sound output goes directly to a connector on the back of the module.
- I2S Out: This digital sound output is fed through a DAC and the analogue L/R signals are directely fed into the Hercules.

9.7 IBOLink Interface

The IBOLink™ approach is such that the conventional TV microcontroller is re-used when digital functionality is added. In principle, the TV can still operate without the bolt-on module. The IBOLink™ software is added to the TV-set software, and is operating as a software bridge.

9.8 Control Interface

The “IBO Zapper” is connected as a slave I^2C device, The I^2C bus should be +5V tolerable and operating at 100kHz(MAX). The “IBO Zapper” module slave address is 0xE4 (similar to IBO+) but is configurable via IBOLink.

All communication from digital module to Television chassis has to be initiated via an active low hardware interrupt line from the digital module.

9.9 UART Interface

The UART interfaces (Universal Asynchronous Receiver And Transmitter) are serial interfaces, which are used to transfer data and commands between two devices.

The “IBO Zapper” system uses an UART interface for serial communication with a PC for:

- Diagnostic SW for Service or Production
- SW uploading for Service or Development

9.10 Power Supply IBO Zapper Module

The “IBO Zapper” module operates from a single 12V supply provided by the TV chassis. All other voltages that the module needs are derived from the +12V. The module has four different physical power states:

- “Off” State.
- “Passive Standby”.
- “Active Standby”.
- “On” State.

Please refer to the LC4.31E AA manual for more information.

9.11 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format
1080i	1080 visible lines, interlaced
1080p	1080 visible lines, progressive scan
2CS	2 Carrier Sound (or 2 Channel Stereo)
480i	480 visible lines, interlaced
480p	480 visible lines, progressive scan
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control; Control signal used to tune and lock to the correct frequency
AGC	Automatic gain control (feedback) signal to the tuner. This circuit ensures a constant output amplitude regardless of the input amplitude
AM	Amplitude Modulation; A "data encoding to a carrier" method, such that the carrier amplitude is proportional to the data value
AP or A/P	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASD	Automatic Standard Detection
AV	External Audio Video
B-SC1-IN	Blue SCART1/EXT1 in
B-SC2-IN	Blue SCART2/EXT2 in
B-TXT	Blue TeleteXT
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz. B= VHF-band, G= UHF-band
C-FRONT	Chrominance front input
CBA	Circuit Board Assembly (also called PCB or PWB)
CL	Constant Level: audio output to connect with an external amplifier
CLUT	Colour Look-Up Table
COFDM	COLour LUMinance Baseband Universal Subsystem. IC performing noise reduction and 2D/3D comb filtering
ComPair	Computer aided rePair. A tool for diagnosing a TV through a PC controlled interface
CSM	Customer Service Mode
CVBS	Composite Video and Blanking Signal; A single video signal that contains luminance, colour, and timing information
CVBS-EXT	CVBS signal from external source (VCR, VCD, etc.)
CVBS-INT	CVBS signal from internal Tuner
CVBS-MON	CVBS monitor signal
CVBS-TER-OUT	CVBS TERrestrial OUTput signal
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DFU	Directions For Use: Owner's manual
DNR	Dynamic Noise Reduction / Digital Noise Reduction; Noise reduction feature of the set
DRAM	Dynamic RAM; dynamically refreshed RAM
DSP	Digital Signal Processing
DST	Dealer Service Tool; Special remote control designed for dealers to enter e.g. service mode (a DST-emulator is available in ComPair)
DTS	Digital Theatre System; A multi-channel surround sound format, similar to Dolby Digital
DVB	Digital Video Broadcast; A method of transmitting digital audio and video, based on MPEG2
DVB-T	DVB-Terrestrial; HDTV standard for the EU
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EPG	Electronic Program Guide: system used by broadcasters to transmit TV guide information (= NexTView)
EU	Europe
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FBL	Fast BLanking; DC signal accompanying RGB signals. To blank the video signal when it is returning from the right side of the screen to the left side. The video level is brought down below the black video level
FM	Field Memory; A memory chip that is capable of storing one or more TV picture fields / Frequency Modulation; A technique that sends data as frequency variations of a carrier signal
FRC	Frame Rate Converter
H	H_sync to the module
HA	Horizontal Acquisition; horizontal sync pulse
HD	High Definition
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz. VHF- and UHF-band
IBO	Intelligent Bolt On
I^2C	Integrated IC bus
I^2S	Integrated IC Sound bus
IC	Integrated Circuit
IF	Intermediate Frequency
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
IR	Infra Red
IRQ	Interrupt ReQuest
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
LATAM	LATin AMerica
LC04	Philips chassis name for LCD TV 2004 project
LCD	Liquid Crystal Display
LED	Light Emitting Diode; A semiconductor diode that emits light when a current is passed through it
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	LoudSpeaker
LVDS	Low Voltage Differential Signalling, data transmission system for high speed and low EMI communication.
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz. M= 525 lines @ 60 Hz, N= 625 lines @ 50 Hz
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MPEG	Motion Pictures Experts Group. An ISO/IEC body that has given its name

	to an image compressing scheme for moving video
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	MUTE Line
NC	Not Connected
NICAM	Near Instantaneously Companded Audio Multiplexing; This is a digital sound system, mainly used in Europe
NOR	
NTSC	National Television Standard Committee. Colour system used mainly in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory; IC containing data such as alignment values, preset stations
O/C	Open Circuit
ON/OFF LED	On/Off control signal for the LED
OSD	On Screen Display
PAL	Phase Alternating Line. Colour system used mainly in Western Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PC	Personal Computer
PCB	Printed Circuit Board (or PWB)
PCMCIA	Personal Computer Memory Card International Association
PIG	Picture In Graphic
PIP	Picture In Picture
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can directly provide the desired frequency
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PWB	Printed Wiring Board (also called PCB or CBA)
RAM	Random Access Memory
RC	Remote Control transmitter
RC5 or 6	Remote Control system 5 or 6, the signal from the remote control receiver
RGB	Red, Green, and Blue colour space; The primary colour signals for TV. By mixing levels of R, G, and B, all colours (Y/C) are reproduced
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync
ROM	Read Only Memory
SAM	Service Alignment Mode
S/C	Short Circuit
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs; This is a 21-pin connector used in EU, that carries various audio, video, and control signals (it is also called Péritel connector)
SCL	Serial CLock Signal on I^2C bus
SD	Standard Definition
SDA	Serial DAta Signal on I^2C bus
SDRAM	Synchronous DRAM
SECAM	SÉquence Couleur Avec Mémoire; Colour system mainly used in France and East Europe. The chroma is FM modulated and the R-Y and B-Y signals are transmitted line sequentially. Colour carriers= 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switched Mode Power Supply
SND	SouND
SOPS	Self Oscillating Power Supply
SPDIF	Sony Philips Digital Interface; a consumer interface, used to transfer digital audio
SRAM	Static RAM
STBY	STandBY
SVHS	Super Video Home System
SW	Software or Subwoofer or Switch
THD	Total Harmonic Distortion
TS	Transport Stream
TXT	Teletext; TXT is a digital addition to analogue TV signals that contain textual and graphical information (25 rows x 40 columns). The information is transmitted within the first 25 lines during the Vertical Blank Interval (VBI)
uP	Microprocessor
USB	Universal Serial Bus
VA	Vertical Acquisition
VL	Variable Level out: processed audio output towards external amplifier
VCR	Video Cassette Recorder
VGA	Video Graphics Array; 640x480 (4:3)
WD	Watch Dog
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
Y	Luminance signal
Y/C	Y consists of luminance signal, blanking level and sync; C consists of chroma (colour) signal
YPbPr	This is a scaled version of the YUV colour space. Y= Luminance, Pb/Pr= Colour difference signals B-Y and R-Y, other amplitudes w.r.t. to YUV
YUV	Colour space used by the NTSC and PAL video systems. Y is the luminance and U/V are the colour difference signals

9.12 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.12.1 Diagram K1, PNx83xx (IC7100)

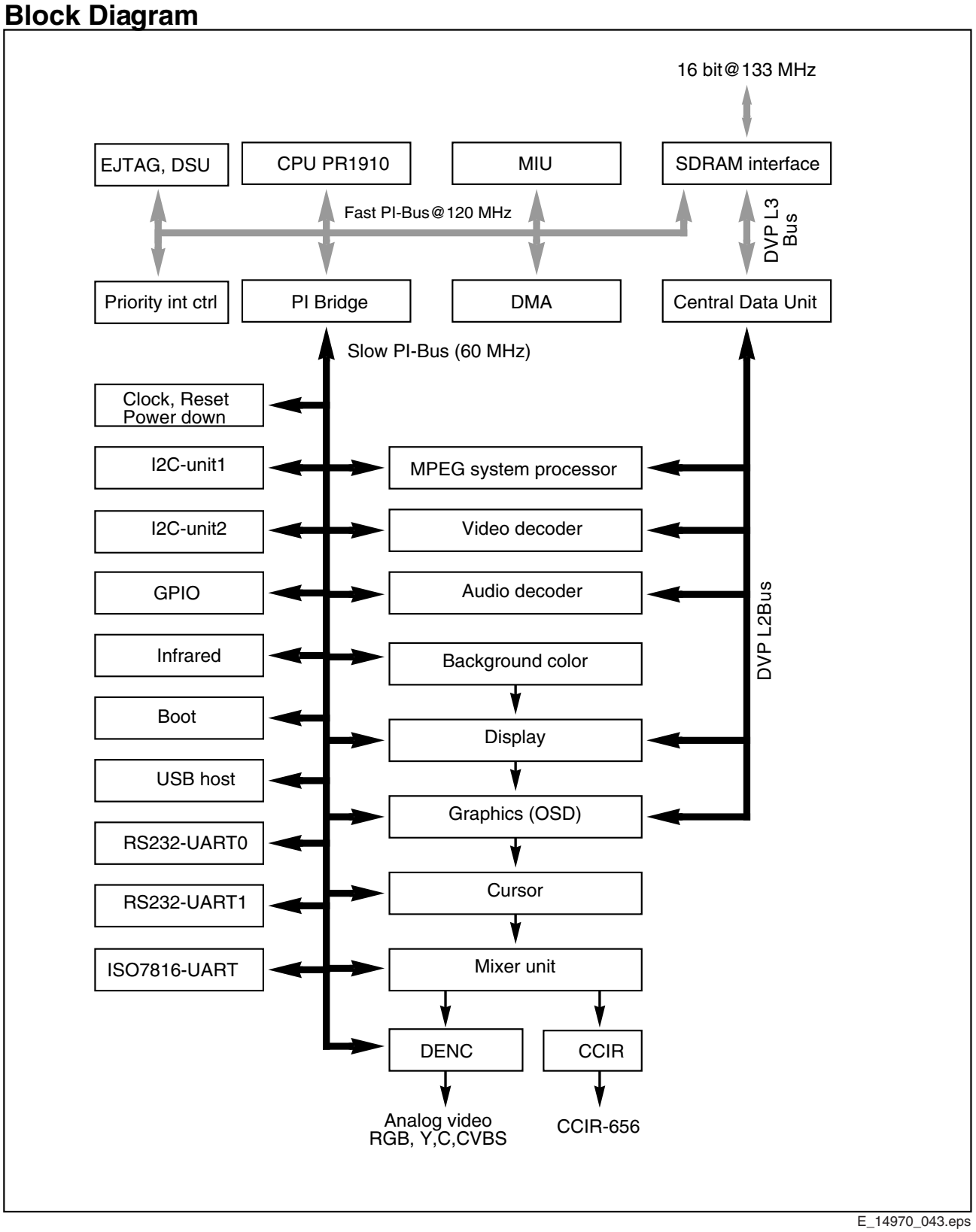


Figure 9-2 PNx831x architecture and data paths

9.12.2 Diagram K6, TDA10046 (IC7600)

Block Diagram

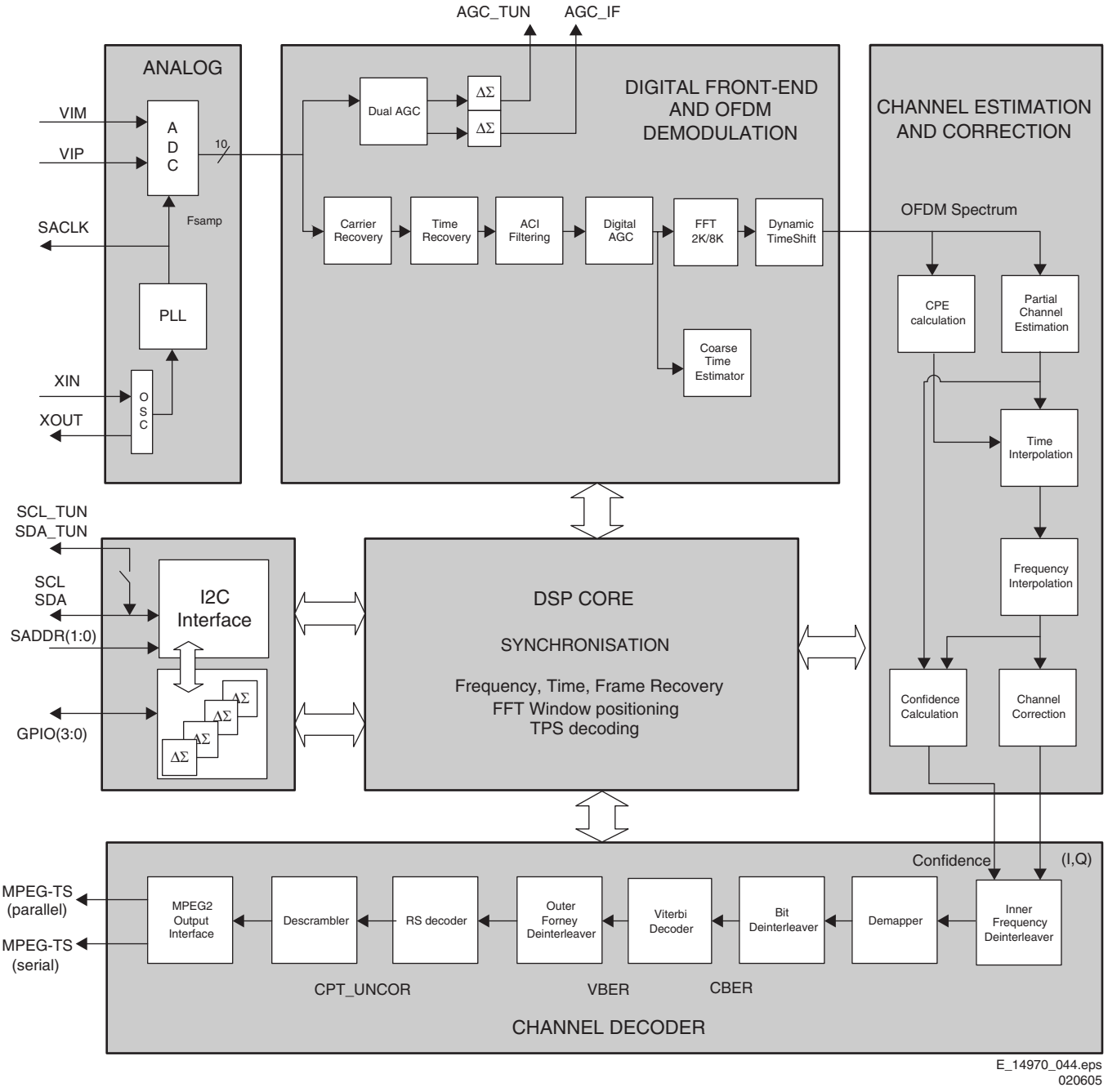


Figure 9-3 Internal blockdiagram TDA10046

10. Spare Parts List

Sets included in this parts list:

26PF5521D/10
26PF5521D/12
32PF5521D/10
32PF5521D/12

Set Level

Various

8301	3139 110 27701	Cable 3p/480/3p Bk
8500	3139 131 06221	FFC 32p/400/32p
8600	3139 131 05451	Wire Phono/340/Phono
8870	3104 311 09151	Cable 6p/400/6p

IBO Zapper Panel [K]

Software

0601	3139 127 04472	IBO Z2 SW R2C49

Various

1028	3139 267 20961	IBO Zap.2.1 Panel ASDM
1301	2422 025 10768	Connector 3p m
1303	2422 128 02863	Switch tact 1p
1304	4822 252 51187	19398E1(0,500A)
1401	4822 267 31729	Connector cinch 1p
1402	4822 267 10459	Connector 3p
1403	2422 025 18799	Socket USB 4p f
1500	2422 025 18872	Connector 32p f
1600	3112 297 13771	TUNER TD1316A/SPHP
1700	2422 033 00364	Connector smartcard
8301	3104 311 02141	Cable 3p/480/3p
8500	3139 131 06221	Cable 32p/400/32P

⊣⊢

2100	4822 124 23002	10µF 16V
2101	4822 124 23002	10µF 16V
2102	4822 124 23002	10µF 16V
2103	2238 586 59812	100nF 20% 50V 0603
2104	2238 586 59812	100nF 20% 50V 0603
2105	2238 586 59812	100nF 20% 50V 0603
2106	2238 586 59812	100nF 20% 50V 0603
2107	2238 586 59812	100nF 20% 50V 0603
2108	2238 586 59812	100nF 20% 50V 0603
2109	2238 586 59812	100nF 20% 50V 0603
2110	2238 586 59812	100nF 20% 50V 0603
2111	2238 586 59812	100nF 20% 50V 0603
2112	2238 586 59812	100nF 20% 50V 0603
2113	2238 586 59812	100nF 20% 50V 0603
2114	2238 586 59812	100nF 20% 50V 0603
2115	2238 586 59812	100nF 20% 50V 0603
2116	2238 586 59812	100nF 20% 50V 0603
2119	2238 586 59812	100nF 20% 50V 0603
2120	2238 586 59812	100nF 20% 50V 0603
2121	2238 586 59812	100nF 20% 50V 0603
2130	4822 124 23002	10µF 16V
2131	4822 124 23002	10µF 16V
2132	4822 124 23002	10µF 16V
2133	4822 124 23002	10µF 16V
2203	4822 124 23002	10µF 16V
2204	2238 586 59812	100nF 20% 50V 0603
2206	4822 124 23002	10µF 16V
2207	2238 586 59812	100nF 20% 50V 0603
2208	2238 586 59812	100nF 20% 50V 0603
2209	2238 586 59812	100nF 20% 50V 0603
2210	2238 586 59812	100nF 20% 50V 0603
2211	2238 586 59812	100nF 20% 50V 0603
2212	2238 586 59812	100nF 20% 50V 0603
2213	2238 586 59812	100nF 20% 50V 0603
2214	2238 586 59812	100nF 20% 50V 0603
2300	4822 126 13881	470pF 5% 50V
2301	4822 124 40849	330UF 20% 16V
2302	4822 124 40207	100µF 20% 25V
2304	2020 021 91506	1000µF 20% 16V
2305	2238 586 59812	100nF 20% 50V 0603
2306	4822 124 40207	100µF 20% 25V
2308	4822 126 13881	470pF 5% 50V
2309	4822 124 40849	330UF 20% 16V
2311	2020 021 91687	470µF 20% 16V
2313	4822 126 13881	470pF 5% 50V
2314	3198 017 33330	33nF 20% 16V 0603
2315	4822 124 40849	330UF 20% 16V
2317	4822 124 40207	100µF 20% 25V
2318	2020 021 91687	470µF 20% 16V
2319	2020 021 91634	100µF 25V
2320	2238 586 59812	100nF 20% 50V 0603
2324	3198 017 44740	470nF 10V 0603
2325	3198 017 44740	470nF 10V 0603
2326	3198 017 44740	470nF 10V 0603
2327	2238 586 59812	100nF 20% 50V 0603
2328	2238 586 59812	100nF 20% 50V 0603
2329	4822 126 13193	4.7nF 10% 63V
2330	2020 021 91687	470µF 20% 16V
2331	4822 126 13193	4.7nF 10% 63V
2332	4822 124 40207	100µF 20% 25V
2333	5322 126 11583	10nF 10% 50V 0603
2334	2238 586 59812	100nF 20% 50V 0603
2335	4822 124 12095	100µF 20% 16V
2336	4822 126 13193	4.7nF 10% 63V
2337	4822 124 22652	2.2µF 20% 50V
2403	2238 586 59812	100nF 20% 50V 0603
2405	2238 586 59812	100nF 20% 50V 0603
2406	3198 032 27190	100µF 6.3V
2411	2238 586 59812	100nF 20% 50V 0603
2412	2238 586 59812	100nF 20% 50V 0603
2413	2238 586 59812	100nF 20% 50V 0603
2500	3198 017 41050	1µF 10V 0603
2501	2020 552 94427	100pF 5% 50V
2502	2238 586 59812	100nF 20% 50V 0603
2503	2020 552 94427	100pF 5% 50V
2504	2238 586 59812	100nF 20% 50V 0603
2505	3198 017 41050	1µF 10V 0603
2506	4822 124 12084	1µF 20% 50V
2507	4822 126 13193	4.7nF 10% 63V
2508	3198 017 41050	1µF 10V 0603
2509	2020 552 94427	100pF 5% 50V
2510	2020 552 94427	100pF 5% 50V
2511	2238 586 59812	100nF 20% 50V 0603
2512	4822 124 80151	47µF 16V
2513	3198 017 41050	1µF 10V 0603
2514	4822 124 12084	1µF 20% 50V
2515	4822 126 13193	4.7nF 10% 63V
2516	4822 124 41643	100µF 20% 16V
2517	2238 586 59812	100nF 20% 50V 0603
2521	4822 122 33761	22pF 5% 50V
2522	4822 126 14221	68pF 5% 50V NP0 0603
2523	4822 126 14508	180pF 5% 50V 0603
2525	4822 126 14508	180pF 5% 50V 0603
2526	4822 126 14221	68pF 5% 50V NP0 0603
2528	4822 122 33761	22pF 5% 50V
2529	4822 122 33761	22pF 5% 50V
2530	4822 126 14221	68pF 5% 50V NP0 0603
2531	4822 126 14508	180pF 5% 50V 0603
2533	4822 122 33761	22pF 5% 50V
2534	4822 122 33761	22pF 5% 50V
2535	4822 122 33761	22pF 5% 50V
2536	4822 122 33761	22pF 5% 50V
2537	4822 126 14508	180pF 5% 50V 0603
2538	4822 126 14221	68pF 5% 50V NP0 0603
2543	4822 124 80151	47µF 16V
2544	2238 586 59812	100nF 20% 50V 0603
2550	3198 017 42240	220nF 16V Y5V 0603
2551	3198 017 41050	1µF 10V 0603
2557	4822 124 23002	10µF 16V
2558	2238 586 59812	100nF 20% 50V 0603
2559	4822 122 33761	22pF 5% 50V
2560	4822 122 33761	22pF 5% 50V
2607	2238 586 59812	100nF 20% 50V 0603
2608	2238 586 59812	100nF 20% 50V 0603
2609	2238 586 59812	100nF 20% 50V 0603
2610	2238 586 59812	100nF 20% 50V 0603
2611	2238 586 59812	100nF 20% 50V 0603
2612	2238 586 59812	100nF 20% 50V 0603
2613	2238 586 59812	100nF 20% 50V 0603
2614	4822 124 80151	47µF 16V
2615	2238 586 59812	100nF 20% 50V 0603
2617	2238 586 59812	100nF 20% 50V 0603
2618	2238 586 59812	100nF 20% 50V 0603
2619	2238 586 59812	100nF 20% 50V 0603
2620	2238 586 59812	100nF 20% 50V 0603
2621	4822 124 80151	47µF 16V
2622	4822 124 80151	47µF 16V
2623	2238 586 59812	100nF 20% 50V 0603
2624	2238 586 59812	100nF 20% 50V 0603
2625	2238 586 59812	100nF 20% 50V 0603
2626	2238 586 59812	100nF 20% 50V 0603
2627	2238 586 59812	100nF 20% 50V 0603
2628	2238 586 59812	100nF 20% 50V 0603
2629	2238 586 59812	100nF 20% 50V 0603
2630	2238 586 59812	100nF 20% 50V 0603
2631	2238 586 59812	100nF 20% 50V 0603
2632	4822 122 33741	10pF 10% 50V
2636	4822 124 11947	10µF 20% 16V
2637	2238 586 59812	100nF 20% 50V 0603
2700	2238 586 59812	100nF 20% 50V 0603
2701	2238 586 59812	100nF 20% 50V 0603
2702	2238 586 59812	100nF 20% 50V 0603
2703	2238 586 59812	100nF 20% 50V 0603
2704	2238 586 59812	100nF 20% 50V 0603
2705	2238 586 59812	100nF 20% 50V 0603
2706	4822 124 23002	10µF 16V
2707	4822 124 23002	10µF 16V
2708	2238 586 59812	100nF 20% 50V 0603
2709	4822 124 23002	10µF 16V
2710	2238 586 59812	100nF 20% 50V 0603
2711	2238 586 59812	100nF 20% 50V 0603
2712	2238 586 59812	100nF 20% 50V 0603
2713	4822 124 23002	10µF 16V
2714	5322 126 11578	1nF 10% 50V 0603
2715	2020 552 94427	100pF 5% 50V

⌐WW⌐

3100	4822 051 30103	10kΩ 5% 0.062W
3101	4822 051 30103	10kΩ 5% 0.062W
3112	4822 051 30103	10kΩ 5% 0.062W
3116	4822 051 30103	10kΩ 5% 0.062W
3117	4822 051 30103	10kΩ 5% 0.062W
3119	4822 051 30103	10kΩ 5% 0.062W
3128	4822 051 30103	10kΩ 5% 0.062W
3130	4822 051 30103	10kΩ 5% 0.062W
3131	4822 051 30103	10kΩ 5% 0.062W
3133	3198 021 32290	22Ω 5% 0603
3134	3198 021 32290	22Ω 5% 0603
3135	3198 021 32290	22Ω 5% 0603
3137	4822 051 30103	10kΩ 5% 0.062W
3138	4822 051 30103	10kΩ 5% 0.062W
3139	4822 051 30339	33Ω 5% 0.062W
3140	5322 117 13036	1.2kΩ 1% 0.063W 0603
3141	4822 051 30103	10kΩ 5% 0.062W
3142	4822 051 30101	100Ω 5% 0.062W
3143	4822 051 30101	100Ω 5% 0.062W
3144	4822 051 30101	100Ω 5% 0.062W
3146	4822 051 30101	100Ω 5% 0.062W
3147	4822 051 30101	100Ω 5% 0.062W
3151	4822 051 30103	10kΩ 5% 0.062W
3154	4822 051 30103	10kΩ 5% 0.062W
3156	3198 031 13390	4 x 33Ω 5% 1206
3157	3198 031 13390	4 x 33Ω 5% 1206
3158	3198 031 13390	4 x 33Ω 5% 1206
3159	3198 031 13390	4 x 33Ω 5% 1206
3160	4822 051 30339	33Ω 5% 0.062W
3161	4822 051 30339	33Ω 5% 0.062W
3162	4822 051 30339	33Ω 5% 0.062W
3163	4822 051 30103	10kΩ 5% 0.062W
3164	3198 021 32290	22Ω 5% 0603
3200	4822 051 30332	3.3Ω 5% 0.062W
3205	4822 051 30103	10kΩ 5% 0.062W
3206	4822 051 30332	3.3Ω 5% 0.062W
3207	4822 051 30332	3.3Ω 5% 0.062W
3209	4822 051 30101	100Ω 5% 0.062W
3210	4822 051 30101	100Ω 5% 0.062W
3211	4822 051 30103	10kΩ 5% 0.062W
3300	3198 021 31080	1Ω 5% 0603
3301	3198 021 31080	1Ω 5% 0603
3303	3198 021 31080	1Ω 5% 0603
3304	5322 117 13046	1.8kΩ 1% 0.063W 0603
3306	2322 704 61002	1kΩ 1%
3307	2322 704 61001	100Ω 1% 0603
3312	3198 021 31080	1Ω 5% 0603
3313	3198 021 31080	1Ω 5% 0603
3314	3198 021 31080	1Ω 5% 0603
3315	4822 051 30102	1kΩ 5% 0.062W
3316	4822 051 30102	1kΩ 5% 0.062W
3317	2322 704 63302	3.3kΩ 1% 0603
3318	3198 021 31080	1Ω 5% 0603
3319	3198 021 31080	1Ω 5% 0603
3320	3198 021 31080	1Ω 5% 0603
3321	3198 021 31080	1Ω 5% 0603
3322	5322 117 13042	3.9kΩ 1% 0.063W 0603
3323	5322 117 13057	820Ω 1% 0.063W 0603
3324	4822 051 30102	1kΩ 5% 0.062W
3325	4822 117 13632	100kΩ 1% 0603 0.62W
3326	4822 051 30103	10kΩ 5% 0.062W
3327	4822 051 30339	33Ω 5% 0.062W
3328	4822 117 13632	100kΩ 1% 0603 0.62W
3330	3198 021 31820	1.8kΩ 5% 0.062W 0603
3331	2322 704 61001	100Ω 1% 0603
3332	5322 117 13055	75Ω 1% 0.063W 0603

3333	4822 051 30273	27kΩ 5% 0.062W
3334	4822 051 30333	33kΩ 5% 0.062W
3403	4822 051 30103	10kΩ 5% 0.062W
3404	4822 051 30561	560Ω 5% 0.062W
3405	4822 051 30102	1kΩ 5% 0.062W
3406	4822 051 30102	1kΩ 5% 0.062W
3407	4822 051 30689	68Ω 5% 0.063W 0603
3411	4822 051 30181	180Ω 5% 0.062W
3420	4822 051 30339	33Ω 5% 0.062W
3421	4822 051 30339	33Ω 5% 0.062W
3422	4822 051 30153	15kΩ 5% 0.062W
3423	4822 051 30153	15kΩ 5% 0.062W
3500	4822 051 30102	1kΩ 5% 0.062W
3501	4822 117 12968	820Ω 5% 0.62W
3502	4822 051 30683	68kΩ 5% 0.062W
3503	4822 051 30102	1kΩ 5% 0.062W
3504	4822 117 13613	2.2Ω 5% 0603
3505	4822 117 12968	820Ω 5% 0.62W
3506	4822 051 30333	33kΩ 5% 0.062W
3507	4822 051 30152	1.5Ω 5% 0.062W
3508	4822 117 13613	2.2Ω 5% 0603
3509	4822 051 30102	1kΩ 5% 0.062W
3510	4822 051 30683	68kΩ 5% 0.062W
3511	4822 117 12968	820Ω 5% 0.62W
3512	4822 051 30101	100Ω 5% 0.062W
3513	4822 051 30101	100Ω 5% 0.062W
3514	4822 051 30102	1kΩ 5% 0.062W
3515	4822 051 30333	33kΩ 5% 0.062W
3516	4822 117 12968	820Ω 5% 0.62W
3517	4822 051 30152	1.5Ω 5% 0.062W
3519	4822 051 30181	180Ω 5% 0.062W
3520	4822 051 30181	180Ω 5% 0.062W
3521	4822 051 30181	180Ω 5% 0.062W
3522	4822 051 30181	180Ω 5% 0.062W
3523	4822 051 30759	75Ω 5% 0.062W
3526	4822 051 30759	75Ω 5% 0.062W
3527	4822 051 30759	75Ω 5% 0.062W
3528	5322 117 11726	10Ω 5%
3530	4822 051 30479	47Ω 5% 0.062W
3533	4822 051 30479	47Ω 5% 0.062W
3539	4822 051 30479	47Ω 5% 0.062W
3543	4822 051 30391	390Ω 5% 0.062W
3544	4822 051 30391	390Ω 5% 0.062W
3545	4822 051 30391	390Ω 5% 0.062W
3547	4822 051 30479	47Ω 5% 0.062W
3557	4822 117 13632	100kΩ 1% 0603 0.62W
3558	4822 051 30102	1kΩ 5% 0.062W
3559	4822 051 30681	680Ω 5% 0.062W
3560	4822 051 30273	27kΩ 5% 0.062W
3561	4822 051 30271	270Ω 5% 0.062W
3562	4822 051 30151	150Ω 5% 0.062W
3572	4822 051 30561	560Ω 5% 0.062W
3573	4822 051 30151	150Ω 5% 0.062W
3574	4822 051 30151	150Ω 5% 0.062W
3575	4822 117 13632	100kΩ 1% 0603 0.62W
3576	4822 117 12968	820Ω 5% 0.62W
3577	4822 117 12968	820Ω 5% 0.62W
3578	4822 051 30759	75Ω 5% 0.062W
3579	4822 051 30103	10kΩ 5% 0.062W
3580	4822 051 30102	1kΩ 5% 0.062W
3581	4822 051 30759	75Ω 5% 0.062W
3582	4822 051 30103	10kΩ 5% 0.062W
3583	4822 051 30222	2.2kΩ 5% 0.062W
3584	4822 051 30271	270Ω 5% 0.062W
3585	4822 051 30121	120Ω 5% 0.062W
3586	4822 051 30221	220Ω 5% 0.062W
3588	4822 051 30222	2.2kΩ 5% 0.062W
3589	4822 051 30271	270Ω 5% 0.062W
3590	4822 051 30121	120Ω 5% 0.062W
3591	4822 051 30221	220Ω 5% 0.062W
3593	4822 051 30222	2.2kΩ 5% 0.062W
3594	4822 051 30271	270Ω 5% 0.062W
3595	4822 051 30121	120Ω 5% 0.062W
3596	4822 051 30221	220Ω 5% 0.062W
3598	4822 051 30102	1kΩ 5% 0.062W
3606	4822 051 30101	100Ω 5% 0.062W
3607	4822 051 30101	100Ω 5% 0.062W
3608	4822 051 30103	10kΩ 5% 0.062W
3609	4822 051 30472	4.7Ω 5% 0.062W
3610	4822 051 30472	4.7Ω 5% 0.062W
3612	4822 051 30472	4.7Ω 5% 0.062W
3613	4822 117 13632	100kΩ 1% 0603 0.62W
3614	4822 117 13632	100kΩ 1% 0603 0.62W
3615	4822 051 30102	1kΩ 5% 0.062W
3618	4822 117 13632	100kΩ 1% 0603 0.62W
3619	4822 117 13632	100kΩ 1% 0603 0.62W
3621	4822 051 30339	33Ω 5% 0.062W
3622	3198 031 13390	4 x 33Ω 5% 1206
3623	4822 051 30472	4.7Ω 5% 0.062W
3624	3198 031 13390	4 x 33Ω 5% 1206
3625	4822 051 30101	100Ω 5% 0.062W
3626	4822 051 30272	2.7kΩ 5% 0.062W
3627	4822 051 30272	2.7kΩ 5% 0.062W
3629	4822 051 30101	100Ω 5% 0.062W
3630	4822 051 30101	100Ω 5% 0.062W
3631	4822 051 30101	100Ω 5% 0.062W
3636	4822 051 30684	680kΩ 5% 0.062W
3637	4822 117 12891	220kΩ 1%
3638	4822 051 30331	330Ω 5% 0.062W
3639	4822 051 30391	390Ω 5% 0.062W
3640	4822 051 30684	680kΩ 5% 0.062W
3641	4822 117 12891	220kΩ 1%
3642	4822 051 30331	330Ω 5% 0.062W
3643	4822 051 30331	330Ω 5% 0.062W
3644	3198 031 13390	4 x 33Ω 5% 1206
3645	4822 051 30103	10kΩ 5% 0.062W
3700	4822 051 30101	100Ω 5% 0.062W
3701	4822 051 30101	100Ω 5% 0.062W
3702	3198 031 13390	4 x 33Ω 5% 1206
3703	3198 031 13390	4 x 33Ω 5% 1206
3704	4822 051 30103	10kΩ 5% 0.062W
3705	3198 031 13390	4 x 33Ω 5% 1206
3707	4822 051 30103	10kΩ 5% 0.062W
3708	4822 051 30103	10kΩ 5% 0.062W
3709	4822 051 30103	10kΩ 5% 0.062W
3710	4822 051 30103	10kΩ 5% 0.062W
3711	4822 051 30103	10kΩ 5% 0.062W
3712	4822 051 30103	10kΩ 5% 0.062W
3713	2322 704 62002	2kΩ 1%
3715	4822 051 30103	10kΩ 5% 0.062W
3716	4822 051 30103	10kΩ 5% 0.062W
3717	4822 051 30103	10kΩ 5% 0.062W
3718	4822 051 30103	10kΩ 5% 0.062W
3719	4822 051 30103	10kΩ 5% 0.062W
3720	4822 051 30103	10kΩ 5% 0.062W
3721	4822 051 30103	10kΩ 5% 0.062W
3722	4822 051 30103	10kΩ 5% 0.062W
3723	3198 031 13390	4 x 33Ω 5% 1206
3724	3198 031 13390	4 x 33Ω 5% 1206
3725	4822 051 30339	33Ω 5% 0.062W
3726	4822 051 30339	33Ω 5% 0.062W
3727	4822 051 30479	47Ω 5% 0.062W
3728	4822 051 30479	47Ω 5% 0.062W
3729	4822 051 30479	47Ω 5% 0.062W
3730	4822 051 30479	47Ω 5% 0.062W
3731	4822 051 30479	47Ω 5% 0.062W
3732	4822 051 30479	47Ω 5% 0.062W
3733	4822 051 30479	47Ω 5% 0.062W
3734	4822 117 13573	4 x 47Ω 5%
3738	4822 051 30479	47Ω 5% 0.062W
3739	4822 051 30479	47Ω 5% 0.062W
3740	4822 051 30479	47Ω 5% 0.062W
3741	4822 051 30479	47Ω 5% 0.062W
3742	4822 051 30479	47Ω 5% 0.062W
3743	4822 051 30479	47Ω 5% 0.062W
3744	4822 051 30479	47Ω 5% 0.062W
3745	4822 051 30479	47Ω 5% 0.062W
3746	4822 051 30479	47Ω 5% 0.062W
3747	4822 051 30479	47Ω 5% 0.062W
3748	4822 051 30479	47Ω 5% 0.062W
3749	4822 051 30339	33Ω 5% 0.062W
3750	4822 051 30339	33Ω 5% 0.062W
3751	4822 051 30472	4.7Ω 5% 0.062W
3752	4822 051 30472	4.7Ω 5% 0.062W

5100	4822 157 11499	Bead 60Ω at 100MHz
5101	4822 157 11717	Bead 50Ω at 100MHz
5102	4822 157 11717	Bead 50Ω at 100MHz
5103	4822 157 11717	Bead 50Ω at 100MHz
5201	4822 157 11499	Bead 60Ω at 100MHz
5202	4822 157 11499	Bead 60Ω at 100MHz
5203	4822 157 11499	Bead 60Ω at 100MHz
5300	2422 536 00491	47µH
5301	4822 157 10452	10µH 10%
5302	2422 535 94639	10µH 20%
5303	2422 536 00548	100µ
5304	4822 157 10452	10µH 10%
5306	4822 157 10452	10µH 10%
5307	2422 535 94639	10µH 20%
5309	3198 018 90050	Bead 1kΩ at 100MHz
5401	4822 157 11499	Bead 60Ω at 100MHz
5420	2422 549 44197	Bead 220Ω at 100MHz
5502	4822 157 11499	Bead 60Ω at 100MHz
5504	4822 157 11499	Bead 60Ω at 100MHz
5505	4822 157 11499	Bead 60Ω at 100MHz
5507	4822 157 11499	Bead 60Ω at 100MHz
5508	4822 157 11499	Bead 60Ω at 100MHz
5511	3198 018 53380	3.3µH 10% 0603
5512	3198 018 53380	3.3µH 10% 0603
5513	3198 018 53380	3.3µH 10% 0603
5514	3198 018 53380	3.3µH 10% 0603
5515	4822 156 21729	Bead 1kΩ 100MHz 0805
5528	4822 157 11499	Bead 60Ω at 100MHz
5600	4822 157 11499	Bead 60Ω at 100MHz
5601	4822 157 11499	Bead 60Ω at 100MHz
5602	4822 157 11499	Bead 60Ω at 100MHz
5604	4822 157 11499	Bead 60Ω at 100MHz
5700	4822 157 11499	Bead 60Ω at 100MHz
5701	4822 157 11499	Bead 60Ω at 100MHz
5702	4822 157 11499	Bead 60Ω at 100MHz
5703	4822 157 11499	Bead 60Ω at 100MHz
5704	4822 157 11499	Bead 60Ω at 100MHz

6300	9322 128 70685	SMSS14
6303	9322 128 70685	SMSS14
6304	9322 128 70685	SMSS14
6307	9965 000 20150	1N4148WS SOD-323
6308	9340 548 48115	PDZ3.6B
6400	9340 548 52115	PDZ5.1B
6401	4822 130 10837	UDZS8.2B
6403	4822 130 10837	UDZS8.2B
6503	4822 130 11397	BAS316
6507	4822 130 11397	BAS316
6508	4822 130 11397	BAS316
6509	4822 130 11397	BAS316
6510	4822 130 11397	BAS316
6511	4822 130 11397	BAS316
6512	4822 130 11397	BAS316
6513	4822 130 11397	BAS316
6514	4822 130 11397	BAS316
6515	9322 129 41685	BZM55-C12

7100	9352 773 55557	PNX8314HS/C102
7200		For SW see item 0601
7202	9322 217 26668	MT48LC8M16A2P-6A
7203	9322 130 41668	M24C64-WMN6
7300	4822 209 60059	MC34063AP1
7301	9322 184 19687	LD1117V18
7302	9322 216 98687	LD1117V
7303	4822 209 60059	MC34063AP1
7305	4822 209 60059	MC34063AP1
7306	9322 165 15685	NCP303LSN30
7307	9322 202 15687	LD1117V50
7308	9322 202 15687	LD1117V50
7309	4822 130 60373	BC856B
7310	3198 010 70510	TL431CZ
7311	9322 231 51685	FET NTR4501NG
7312	5322 130 60159	BC846B
7402	5322 130 60159	BC846B
7403	9322 150 49668	LM3525M-H
7500	4822 130 60373	BC856B
7501	5322 130 60159	BC846B
7502	9352 668 47118	UDA1334BTS/N2
7503	4822 130 60373	BC856B
7504	5322 130 60159	BC846B
7507	5322 130 60159	BC846B
7511	4822 130 60373	BC856B
7512	5322 130 60159	BC846B
7518	4822 130 60373	BC856B
7519	5322 130 60159	BC846B
7520	5322 130 60159	BC846B
7521	4822 130 60373	BC856B
7522	5322 130 60159	BC846B
7523	4822 130 60373	BC856B
7524	4822 130 60373	BC856B
7525	5322 130 60159	BC846B
7526	4822 130 60373	BC856B
7527	4822 130 60373	BC856B
7528	5322 130 60159	BC846B
7529	4822 130 60373	BC856B
7600	9352 732 45557	TDA10046AHT/C1
7601	5322 209 70225	LM393D
7605	9352 630 16165	74AHC1GU04GW
7606	9352 630 16165	74AHC1GU04GW
7700	9322 227 91671	STV0700L
7701	9352 190 10118	74LVC573ADB
7702	9352 190 10118	74LVC573ADB
7703	9352 115 40118	74LVC245APW
7704	2722 171 00207	Xtal 27MHZ 50P
7705	9322 175 13668	ST890CD

11. Revision List

Manual xxxx xxx xxxx.0

- First release.